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# AMERICAN JOURNAL OF OPHTHALMOLOGY

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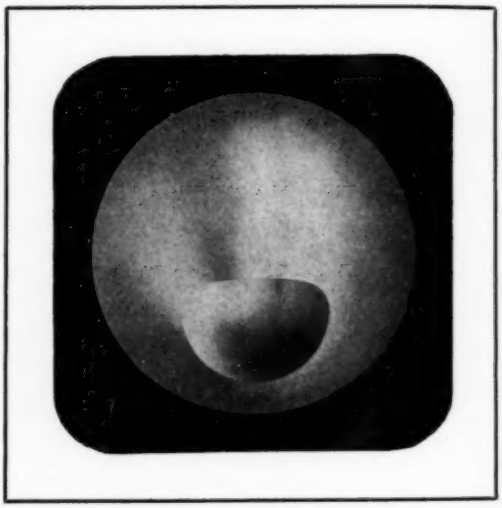

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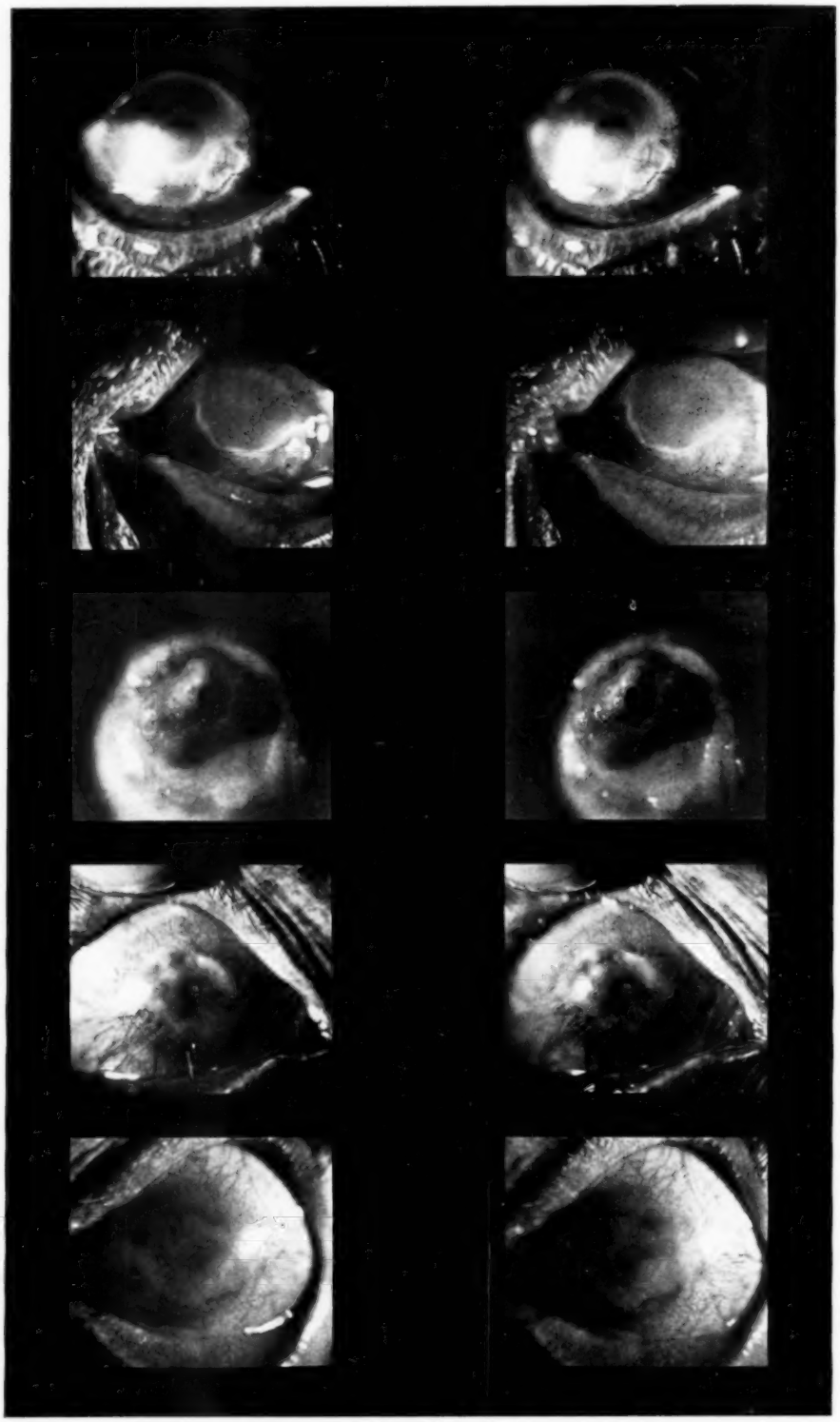

FIGS. 1-5. (BEDELL).

READING FROM TOP TO BOTTOM. THE UPPER THREE STEREOSCOPIC PHOTOGRAPHS ILLUSTRATE THE CASE OF MRS. B. AND THE LOWER TWO THE CASE OF J. W.

AMERICAN JOURNAL OF OPHTHALMOLOGY
VOLUME 16 APRIL, 1933 NUMBER 4

# MOOREN'S ULCER

ARTHUR J. BEDELL, M.D., F.A.C.S.
ALBANY

Conclusion of a case previously reported, and the full report of another case characterized by intense pain and terminating in perforation of the cornea are presented. Enucleation was performed. Report of microscopic section gave the diagnosis of tuberculosis, but no bacilli were found. Read before the American Ophthalmological Society, New London, June 27, 1932.

Mooren's ulcer continues to be a baffling disease. Many conditions which seem to simulate it have been described and some cures have been reported. A perusal of the literature leads one to the conclusion that several cases have been recorded as Mooren's ulcer which, strictly speaking, did not belong in that classification. It is, therefore, highly probable that most of the cases that have been recited as cured by various and sundry treatments were not ulcers of the Mooren class.

Triebenstein[1] reviewed the literature and called attention to the characteristics of the Mooren ulcer. He found 140 recorded cases but doubted whether more than forty or fifty were of the true type.

Gifford[2] cites the cure of a patient who had, clinically, a typical Mooren's ulcer. In the early stage of his case nothing seemed to check the progress of the disease. He finally performed a delimiting keratotomy 2 mm. long in front of what seemed to be the most active point of ulceration; after keeping the wound open for a week or so it began to heal.

In 1921 the history of a man, J. W., with Mooren's ulcer was presented by me[3] before this Society (see frontispiece, figs. 4 and 5). Your attention is drawn to that report because now, twelve years later, I am able to tell you of his condition and exhibit photographs of his corneae.

On March 3, 1932, the vision of the right eye was 3/200 and Jaeger 14. The cornea, more convex than normal, showed marked limbic vascularization with an overgrowth of tortuous conjunctival vessels and straight palisade-like loops in the stroma. The entire cornea was slightly clouded with dense interstitial opacities almost completely surrounding the comparatively clear center. In several places there were small flecks which appeared like calcified flakes. These were particularly evident in the broad, upper-nasal opacity. The iris was of normal color. The pupil was 2 mm., reacting promptly to light and accommodation. There was a grayish-white membranous balloon attached to the nasal side of the posterior surface of the iris. In this white membrane there were many specks of dark brown uveal pigment. The iris in the region of the balloon was attenuated with teased-out border and many pigmented masses.

(BEDELL) LEGENDS TO PLATE 2

Mooren's ulcer. Stereoscopic photographs

Fig. 1. Mrs. B., right eye. December 9, 1930. Corneal ulcer with deep and superficial vascularization.

Fig. 2. Mrs. B., left eye. December 15, 1931. Loss of the superficial layers of the cornea with the vascularization which has come from the conjunctival system. A grayish-yellow corneal ulcer with overhanging edge and gray infiltration of the part which has escaped destruction.

Fig. 3. Mrs. B., left eye. February 25, 1932. Photograph of the eyeball after enucleation. A large, bulging prolapse of the iris and Descemet's membrane with a vertically oval perforation through which the lens extruded at the time of operation. Surrounding the limbus are several elevated, yellowish-white gelatinous masses.

Fig. 4. J. W., right eye. Mooren's ulcer twelve years after subsidence of the acute stage.

Fig. 5. J. W., left eye, after twelve years without clinical sign.

Left eye: Vision 3/200, Jaeger 20. The cornea, although not as curved as the right, was more extensively scarred with many thick, gray-white opacities of uneven margin and unequal depth. These were especially dense and gray over the pupillary area. Two distinct blood-vessel systems could be traced over and into these scars. The superficial ones were tortuous loops, the deeper ones, straighter lines. All of the vessels were patent. The pupil was 3 mm., regular, active to light and accommodation. There were many pigmented collections on the lens capsule, some stellate, others like small dots, rounded and ball-like, while still others were elongated threads.

As far as we have been able to discover, photographs have never been published showing the end results of a healed Mooren's ulcer.

In this connection it is interesting to recall Collins's[4] observation of a bilateral Mooren's ulcer which he reported six years after the active symptoms had subsided. He stated that all of the blood vessels had disappeared from the cornea and the opacity was still densest in the center. This is in contrast to the case to which we have just referred where the vascularization remained a prominent feature of the disease.

A recent experience with Mooren's ulcer was in the case of Mrs. B., forty-three years of age, who was first seen December 9, 1930. She stated that she had worn glasses for about thirty-three years. Her latest change was made two years ago. She further said that she had had several attacks of ulcers, involving both eyes. The present one started in August, 1930. She had had various treatments, including actual cautery and iodin. During the attacks she always had excruciating pain in the eye and head. Her physical examination was reported to be negative. All of her teeth had been removed, her throat was normal, and I considered the condition to be a trophic ulcer of undetermined origin.

The vision of the right eye was 5/200. There was marked irritation of the skin of the eyelids. The moderate congestion of the globe was greatest near two areas of corneal infiltration. The one on the outer side was slightly yellowish-gray and only faintly roughened. The other, in the lower nasal quadrant, showed a large, oval excavated area. The curved corneal edge was faintly yellow and not undermined. The superficial vessels were seen in the middle and lower portions of the cornea near the limbus as tortuous, conjunctival extensions. The others were somewhat fan-shaped, straight radiations, lying on a deeper level and could not be traced to their source. Under the slit-lamp the interstitial vascularization was clearly determined. The cornea was anesthetic. The limbus border was very slightly elevated. The 4.5 mm. pupil did not respond to light. The fundus was dimly seen through a thin, dotlike vitreous haze.

The vision of the left eye was 20/70, with correcting glass 20/30. There was no congestion of the globe, the conjunctiva was negative, the pupil was 3.5 mm., regular and active, the media were clear, and the disc distinctly outlined with pigmentation of the nasal border.

Her right eye was enucleated in January, 1931, but, unfortunately, I have been unable to secure the globe or receive any detail regarding the condition found.

The patient was not seen again by me until August 5, 1931, when she showed a deep, white, ulcerated, corneal arc near the lower limbus (see frontispiece, figs. 1, 2, and 3). She was placed in the hospital for observation. The condition remained fairly stationary so that on August 28 the Shahan thermophore was applied. This seemed to have no effect on the course of the disease and she was discharged from the hospital on August 30.

The ulcer continued to increase in size and was accompanied by severe, intense pain which was constant and almost unbearable. The cornea was totally anesthetic. There was also considerable skin irritation about the lids. On September 5 there seemed to be no question as to the diagnosis of Mooren's ulcer. Up to that time the characteristic undermining of the corneal edge had not developed.

A photograph made on October 17 clearly showed the slight circumcor-

neal injection, the yellowish-gray undermined border of the ulcer and the faint vascularization of the portion of the cornea already destroyed.

On November 4 the ulcer was not only more extensive but the yellowish-gray, overhanging lip was greatly increased in size with a corresponding increase in the bulbar congestion. It was especially noted that only the external portions of the cornea were involved in this destructive process. The iris remained of normal color, the pupil reacted promptly to light and accommodation and there was no tendency to the formation of synechiae.

There was very marked increase in the pain with accentuated blepharospasm, lacrimation, and skin irritation on December 2. There was more extensive loss of corneal tissue, the eyeball congestion was greater, and a few small, gelatinous-appearing nodules were seen in the conjunctiva near the limbus.

Two weeks later, the external lid condition remained the same. The advancing border of the ulcer was deep yellow-gray with an overhanging margin of more than a millimeter. There was a definite circumcorneal swelling resembling, in general characteristics, solid edema. New blood vessels covered the part of the cornea which had been eroded.

By December 30 there was less swelling of the eyelid, somewhat less congestion of the globe and the infiltrated edge of the ulcer was clearer. The surface of the cornea on the nasal side was papillated with small, projecting loops of new vessels which gave the appearance of recently developed granulation tissue. The other parts of the denuded cornea were flat and completely vascularized.

The next two weeks produced a very marked change for the worse. It was with the greatest difficulty that the eyelids could be opened. A tenacious, thick, and firmly adherent gray-yellow membrane covered the ulcer and much of the adjacent cornea.

On January 30, 1932, while her home attendant was dressing the eye, the blepharospasm was unusually severe and she immediately complained of a sudden sharp pain which was followed by a gush of fluid. There was a perforation on the nasal side of the cornea near the limbus. Almost all of the cornea was involved in the ulcerative process. The globe was slightly flattened and there was a marked circumcorneal elevation with moderate fullness of the conjunctival vessels.

When seen on February 20 the iris bulged far forward and was only held in place by Descemet's membrane. The globe was very soft and enucleation was

Fig. 6 (Bedell). Mooren's ulcer. Cross section of the globe showing the perforation of the cornea and the marked infiltration of the limbus.

advised. The following day, under ether, the eyeball was removed. There was profuse bleeding as soon as the conjunctiva was incised. The conjunctiva and subconjunctival tissues were matted together in a whitish-yellow, gelatinous-appearing mass which in places was several millimeters thick. Healing was uneventful.

The eyeball was sent to Dr. Verhoeff who reported as follows:

"Diagnosis: Episcleral tuberculosis. Perforation of cornea.

"Microscopic: On each side the episcleral tissue is greatly thickened due to infiltration with chronic inflammatory cells. This tissue contains numerous small and large foci of epithelioid and giant cells. The cornea is perforated, the iris is protruding through the perforation, and on one side is fused with granulation tissue which represents the remains of the cornea. On this side there

is about 1.5 mm. of cornea left at the periphery. The surface of the cornea here has been destroyed by the episcleral process, but the cornea itself contains no tuberculous foci. On the other side the superficial layers of the cornea have been cast off, and the surface of the cornea covered with thickened epithelium. Here, also, the cornea contains no tuberculous foci. The iris is markedly infiltrated with lymphocytes and plasma cells, and is giving off an exudate of pus cells. There is an exudation of pus cells taking place also from the ciliary body. Beneath the pars plana of the ciliary body there are a few small tubercles. The anterior part of the choroid is markedly infiltrated with lymphocytes as far back as the equator, and contains small tuberculous foci consisting of epithelioid and giant cells. In the fundus the choroid is markedly congested, but practically free from infiltration. The retina shows nothing of importance. The optic disc is greatly swollen, no doubt due to low intraocular pressure resulting from the perforation of the cornea."

Subsequently Dr. Verhoeff reported that a prolonged search failed to disclose the tubercle bacilli in any of the sections.

**Retrospect:** The patient was a healthy appearing, forty-three-year-old woman, who for several years had had repeated attacks of superficial corneal ulcers. The one in the right eye was of the trophic type and yet the annoyance and destruction became so marked that the globe was enucleated.

In June, 1931, her remaining eye became involved and the cornea perforated the following February. All sorts of treatments were used without avail. The case is reported because the cornea perforated and because of the pathologic findings.

A perforation of the cornea has been considered by most authors as improbable or even impossible but our case can be grouped with those described by Spicer[5], Feingold[6], and others who have previously recorded this terminal complication.

The pathologic appearance suggesting tuberculosis has been reported by several including Feingold in his thesis before this Society in 1920, Koeppe[7], and Mori[8].

**Summary:** A supplementary account of a previously reported case of Mooren's ulcer is recorded by stereoscopic photographs and clinical description.

Another case of Mooren's ulcer is cited in which it was necessary to enucleate both eyes. There was perforation of the cornea and pathologically the appearance of tuberculosis. Stereoscopic photographs illustrate the unrelenting progress of the disease, which no treatment seemed to control or even retard.

Intense pain has been spoken of as an outstanding symptom by most observers. In the second case this was almost constant in contrast to the first where the patient never complained of pain.

It would seem from a study of the literature that many cases have been called Mooren's ulcer when they probably belonged in some other group. Actual recovery from a Mooren's ulcer must indeed be rare.

344 State street.

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# TREATMENT OF CORNEAL INFECTIONS

JOHN E. WEEKS, M.D.
PORTLAND, OREGON

In this communication the writer indicates a rational line of treatment for corneal infections (other than those from leprosy, syphilis and tuberculosis), that may be followed with safety, and with a minimum destruction of corneal tissue. Read before the Pacific Coast Oto-Ophthalmological Society, June 20, 1932.

In cases of corneal infection the general health of the patient, and possible foci of toxic processes, such as teeth, tonsils, accessory sinuses, intestines, and others, should be taken into consideration and measures instituted to correct all abnormal conditions. A depressed state of the system as, for instance, from intestinal toxemia, by lowering the resistance of the corneal tissue to bacterial invasion predisposes to corneal ulcer. This is not infrequently manifested by the appearance of marginal, multiple, superficial, circular, shallow ulcers, which tend to coalesce, forming crescentic ulcers in which the Zur Nedden bacillus is found. An absence of certain necessary vitamins in the diet may bring about a keratomalacia in marasmic infants and in young children, and a condition known as xerosis corneae in adults.

Aside from infections of the cornea due to the gonococcus, which is more common in infants and young adults, serious infections such as from the pneumococcus, diplobacillus, and streptococcus, occur most frequently after the age of forty years. Löwenstein (Klin. Monatsbl. f. Augenh., Aug., 1910) reports that of sixty cases of severe corneal infection only fifteen occurred in individuals under forty-five years of age. Of 131 cases seen in two years the bacterial findings, by smear and by culture were: pneumococcus, seventy; diplobacillus, twenty-one; streptococcus, bacillus fluorescens and bacillus pyocyaneus, each one; staphylococci and xerosis bacilli, thirty-six; actinomyces, one.

A rational treatment can best be determined if we know the microörganism concerned in the infection, and are acquainted with its cultural peculiarities and virulence in the cornea. The microörganisms chiefly found in corneal infections are enumerated in the following list, together with the thermal range of their growth indicated in degrees Fahrenheit.

| | |
|---|---|
| Bacillus diphtheriae (Klebs-Loeffler) | 60°-110° F. |
| Bacillus influenzae (Pfeiffer) | 77°-110° F. |
| Bacillus Koch-Weeks | 77°-110° F. |
| Bacillus pneumoniae (Friedländer) | 46°-108° F. |
| Bacillus pyocyaneus (blue milk) | 46°-110° F. |
| Bacillus Zur Nedden | 46°-110° F. |
| Diplobacillus (Morax-Axenfeld) | 55°-110° F. |
| Diplobacillus (Pettit) | 55°-110° F. |
| Gonococcus (Neisser) | 78°-106° F. |
| Pneumococcus | 71°-106° F. |
| Staphylococcus aureus | 46°-110° F. |
| Streptococcus pyogenes | 52°-110° F. |
| Aspergillus | 68°-108° F. |
| Bacterium coli | 52°-110° F. |

When the thermal range of the growth of the microörganisms that are pathogenic to the cornea is considered, the futility of destroying them, or of greatly retarding their development by hot or cold applications to the eyelids, becomes apparent. The constant application of crushed ice in thin, small ice bags, may produce refrigeration of the cornea before it reduces the temperature of the conjunctival sac below 85° to 80° F., and necessitate discontinuing the applications. Refrigeration of the cornea is first indicated by a slight haziness of the epithelium. It will be noted that none of the microörganisms mentioned thrive at a temperature above 110° F. and that the lower limit of growth is not above 78° F., for any of them.

Repeated measurements by the writer, after cold applications to the eyelids, have never shown a temperature below 92° F., and, after hot applications, never a temperature above 103° F. If the favorable effect of subcutaneous injections of foreign proteins depends on a systemic rise of temperature, I do not think that much benefit in the treatment of corneal ulcers, can be obtained from this source, for a tempera-

ture of above 104° F. is seldom reached. Fortunately the cornea will tolerate a one-minute exposure to a temperature of 156° F., which is sufficient to destroy microörganisms without serious damage to the tissue. This renders the service of the thermophore of great value in certain cases of corneal infection.

With few exceptions ulcers from bacterial infection are exogenous. They follow abrasions of the cornea in almost all cases. When the gonococcus or the Klebs-Loeffler bacillus is the etiologic agent, a necrosis of the epithelium and adjacent corneal tissues, follows the conjunctivitis induced by these microörganisms. Endogenous infections of the cornea present themselves as various forms of interstitial keratitis, and as deep-seated, punctate keratitis.

Inasmuch as the treatment that should be employed in combating an infection of the cornea depends largely on the microörganism concerned, it is desirable to make an early identification of the type involved. Accompanying conditions often suffice to enable the surgeon to make this determination. In about 30 percent of pneumococcic ulcers there is a more-or-less-pronounced, chronic dacryocystitis present, discharging pus into the conjunctival sac. In the greater number of cases this pus contains pneumococci, in addition to other bacteria. The diplobacillus ulcer not infrequently accompanies a Morax-Axenfeld conjunctivitis, a prominent feature of which, in many cases is the erosion at the external canthus. The pneumococcus ulcer is, almost without exception, of the "serpent ulcer" type; that is, the advance is greatest from one side where there is usually an "over-hang" and where the ulcer is deepest. Ulcers from other infections are circular or diffuse and, excepting the Mooren ulcer, seldom have an over-hang. To be certain of this a smear taken from the floor of the ulcer at the site of greatest activity, or a culture made from the same site, is desirable, and will almost invariably show the microörganisms within twenty-four hours.

In the treatment of corneal infections in general, certain possible conditions should be considered. The tension of the eye is important. In a very high percentage of cases of severe infection of the cornea, the tension of the eye is too high, causing an interference with the defensive and reparative processes, by blocking the lymph channels in the corneal tissue. This calls for the use of a miotic in cases in which there is no iritis, and in others for a paracentesis, a Saemisch incision, a deWecker corneal incision, or an iridectomy. The opening into the anterior chamber by the first three procedures, is to be kept patent as desired. Dionin as a vasodilator in from two to four percent solution may aid in improving the nutrition of the cornea in these cases. The writer does not hesitate to open the anterior chamber in cases of actual or suspected hypertension, even in infants with corneal ulcer accompanying ophthalmia neonatorum. He has never seen a panophthalmitis and very seldom any untoward condition as a result. If hypopyon is present, it may be removed in part or wholly, or it may be permitted to remain if it does not prevent escape of aqueous. The hypopyon is sterile as a rule.

Ordinarily atropine should be employed to maintain a dilatation of the pupil to about two thirds of the maximum, since some degree of iritis so frequently accompanies corneal infections. The indiscriminate use of atropine is not advisable. To control tension the writer prefers tapping the anterior chamber to the use of miotics. For use in the treatment of corneal infections we have at our disposal, among other things, the following:

For cleansing the eye: normal saline solution, boric acid solution, solutions of mercuric chloride (1:10,000 to 1:15,000).

Germicides: chlorine water (fresh), mercurochrome, metaphen, salicylic acid, silver nitrate, tincture of iodine, formaldehyde.

Sera and vaccines: antidiphtheritic serum, auto- and polyvalent vaccines.

Mydriatics: atropine, scopolamine.

Miotics: pilocarpine, physostigmine (eserine).

Subconjunctival injections: cyanide of mercury (1:1000), mercuric chloride (1:250 to 1:500).

Stimulants: hot compresses and bathing with hot solutions, ethyl morphine hydrochloride (dionin).

Escharotics: carbolic acid (phenol), nitric acid, trichlor-acetic acid.

Thermal measures: hot compresses and bathing, cautery, thermophore.

In the study of all loss of corneal tissue it is desirable to instill a drop of two percent fluorescein solution, and subsequently to irrigate the eye with a solution of boric acid in order accurately to define the area of the defect.

It has been shown by Axenfeld that in the infection due to the pneumococcus, the microörganisms are to be found in the corneal tissue, in the floor of the ulcer below the over-hang, when this exists. The location of the microörganisms in other forms of infection is in the floor and in the walls of the ulcer.

In the treatment of a pneumococcal ulcer the writer proceeds as follows: The patient is advised to go to a hospital and is prepared for the treatment of the ulcer as soon as possible. If the lacrimal sac is secreting pus a canaliculus is opened, a good-sized probe is passed through the lacrimal duct if possible, and the sac and duct are thoroughly cleansed with a germicidal solution. If the lacrimal duct cannot be rendered patent the lacrimal sac is cleansed with an antiseptic solution, once every twenty-four hours, and excised at an opportune time. Under cocaine and holocaine anesthesia the overhang is cut away by the use of fine forceps and scissors. The secretion and necrotic tissue in the ulcer are gently but quite thoroughly curetted away, using small, sharp curettes, and the floor and walls of the ulcer cauterized. The cauterization is effected by means of a small, bulbus, actual cautery (the Prince cauterizing instrument is excellent), the bulb being brought to a dull red heat. If there is any indication of hypertension, with or without hypopyon, the anterior chamber is opened by any method that may seem most desirable, either before or after cauterization. The conjunctival sac is cleansed, using a mild aseptic or antiseptic solution, atropine is instilled, White's ointment, or bichloride vaseline (1:5000), introduced liberally and a light bandage applied. In twelve to twenty-four hours the eye is cleansed and inspected. If at this, or at any subsequent dressing, there is any evidence of renewed activity, the active area is gently curetted, the cautery is reapplied to that area and the dressing replaced as before. The inspection is repeated as often as is deemed necessary, but too frequent disturbance of the eye is avoided. In the writer's experience this method of procedure in corneal infections due to the pneumococcus, even in advanced, desperate cases, is successful. Other less radical procedures may succeed; the writer knows of none that is so sure. The resulting cicatrix, after this procedure is scarcely more than may occur if other, less safe methods, are pursued.

The electric cautery is not so easily controlled either in application or in temperature as is the bulbus, actual cautery. The desire in the use of the cautery is not so much to produce an eschar as to permit the penetration of heat sufficient to destroy the microorganisms concerned.

Ethyl hydrocuprein hydrochloride (optochin) has been employed as a specific against the pneumococcus in corneal infection caused by this microorganism, using topical application of a fresh two percent solution, after the secretion and necrotic tissue have been curetted away, with reported excellent results. This method of treatment is not now employed to any great extent. Pneumococcal corneal ulcers present a mixed infection in approximately 20 percent of the cases. While optochin in the strength mentioned may be a specific remedy against the pneumococcus it is not specific against the other microörganisms that may be present. It is possible that this may account for the abandonment by many ophthalmic surgeons of the use of optochin for the treatment of corneal ulcer.

The diplobacillus, staphylococcus, and streptococcus infections of the cornea produce circular or irregular ulcers that do not advance so rapidly as do infections by the pneumococcus. Mixed infections occur in at least ten to twenty

percent of these ulcers. The corneal ulcer accompanying a Morax-Axenfeld conjunctivitis may be controlled by the topical application of a two percent solution of a zinc salt, either the chloride or the sulphate, since these salts are specific against this diplobacillus. The application is made by means of a probang, often with a wooden toothpick around the end of which a small amount of absorbent cotton is firmly wound, without projecting fibers. The cotton is dipped in the solution, the surplus removed and, after the secretion and necrotic tissue have been removed from the ulcer, the floor and the walls of the ulcer are thoroughly touched with the applicator. The conjunctival sac may then be irrigated with a solution of zinc sulphate (¾ grain to the ounce), or White's ointment; or bichloride ointment 1:5000 may be introduced and a light dressing applied. The eye should be inspected at the end of twelve to twenty-four hours and, if progress of the infection is noted, a second application of the zinc solution should be made and the eye dressed as before. If further progress is noted it is best to resort to the use of the cautery.

Other small, slowly progressive ulcers of the cornea may be treated by topical applications of: salicylic acid, ten percent solution in alcohol; metaphen 1:3000; ten percent formaldehyde (freshly prepared); tincture of iodine, or carbolic acid. After an interval of one or two minutes the eye should be irrigated with a solution of boric acid and dressed as mentioned above, except when the pure carbolic acid is used, in which case, after the lapse of half a minute the acid should be neutralized by the use of 50 percent alcohol and dressed as previously advised.

Trichloracetic acid and nitric acid if used should be applied with a smooth, bare, wood applicator, dipped, and all surplus removed; the application made sparingly and properly controlled.

Superficial, marginal ulcers, in which the Zur Nedden bacillus and often the staphylococcus are found, are frequently preceded and accompanied by intestinal toxemia.

In recurrent erosion of the cornea, a most distressing condition, it is my custom after removing all loosely applied epithelium, to make a single application of a freshly made ten percent solution of formalin to the denuded area, followed by the instillation of one of the ointments mentioned, and the application of a light dressing to both eyes for twenty-four to forty-eight hours. If a relapse occurs at any subsequent time, the second application is one of pure carbolic acid, made as described above, followed by the ointment and a light dressing, occluding both eyes. If there is a recurrence of the erosion, the actual cautery is applied lightly to the entire denuded surface, ointment and a light dressing following. The writer has never had a recurrence after the cautery was applied. Success not infrequently follows the use of the milder applications; they are made in order that the resulting haziness of the cornea may be as slight as possible.

Infection from the bacillus pyocyaneous occurs with few exceptions, from an abrasion of the cornea made by an object, usually a vegetable, bearing the bacilli. The writer has observed one case in which the infection occurred in a partly healed abrasion, following the impaction of a metallic foreign body. The destruction of corneal tissue after infection with this bacillus is the most rapid of any that the writer has observed, with the possible exception of that occurring in ring abscess. Within thirty-six hours the entire area of the cornea may become involved, and the superficial layers necrotic. Whatever measures for relief are employed must be applied early and frequently. The invaded surface usually presents a bluish or greenish shimmer. The bacillus grows rapidly on peptone agar at blood temperature, and imparts a bluish tinge to the surface and supernatant fluid.

*Fresh* chlorine water, dropped upon the cornea, after irrigation with a solution of boric acid—every hour at first, less frequently as the destruction of corneal tissue ceases—has been found by the writer to be effective. The pupil should be kept moderately dilated. To allay pain a one percent solution of holocain dropped into the eye may precede the chlorine instillations. Metaphen, 1:3000, used as advised with

chlorine water, proved to be quite effective in one case. Mercurochrome was not so effective. After destruction by the bacillus has ceased, the bichloride dressing is applied. A two to five per cent solution of dionin is instilled once daily during the healing process. Of the four cases observed by the writer, vision was virtually lost in three. Panophthalmitis and tenonitis may occur from this infection. Fortunately only the traumatized eye is affected. Thermal applications do not appear to be applicable in this variety of infection, because of the large area that has usually become affected before the patient is seen by the ophthalmic surgeon.

There are a few forms of corneal infection that are particularly suited to thermal treatment by means of the thermophore of Shahan. Of these may be mentioned, disciform keratitis, superficial and deep punctate keratitis, and some forms of sluggish ulceration. Disciform keratitis is an unusual, apparently exogenous infection of the cornea, in which the manifestations of the infection occur principally in the deeper layers of the cornea. Its progress does not appear to be much affected by ordinary methods of treatment. It may run its course leaving but a faint leucoma, or it may destroy the eye. These infections do not appear to be influenced by the application of chemical germicides. Fortunately we possess in the thermophore of Shahan an instrument by the use of which we may increase the temperature of the corneal tissue to a point that will destroy nonsporebearing bacteria, without serious damage to the tissue. A one-minute exposure, with the thermophore in gentle contact with the cornea, and at a temperature of 156° F. will be tolerated by the cornea without permanent damage although the epithelium will be lost over the area of contact. The lost epithelium will be quickly restored.

Of ring abscess the writer has seen but very few cases. Two of these occurred in the practice of colleagues after the extraction of cataract. The germs found were streptococcus pyogenes and the staphylococcus aureus. In one case the eye was lost, in the other the destructive process was arrested by the use of the actual cautery.

Ulceration of the cornea, in the course of a gonorrhoeal conjunctivitis, is often favorably affected by a Saemisch incision, its arrest depends, of course, on arrest of the conjunctivitis.

Loss of corneal tissue accompanying a diphtheritic conjunctivitis, will cease on arrest of the conjunctivitis, which responds readily to the subcutaneous injection of 5000 units of anti-diphtheritic serum, one to three injections. As the destruction progresses rapidly, treatment must be applied early.

Corneal infections with aspergilli and actinomyces, are extremely rare. The writer has seen four or five cases of infection with aspergilli, one with niger, the others with fumigatus, none with actinomyces. The aspergillus infections appear as rather flat, slightly raised areas, ordinarily with a suggestion of a groove at the margin of the patch, hard to the touch with the probe, and with very little pericorneal injection. The treatment consists in curetting the area in order to remove infected tissue, and applying the actual cautery at a dull red temperature. The introduction of White's ointment and the usual dressing follow.

Collyria containing the acetate of lead should never be used in the conjunctival sac, for if there is an abrasion of the cornea, or a corneal ulcer, a deposit of the carbonate of lead may take place, producing a permanent white or yellowish-white plaque in the superficial layers of the cornea.

If a corneal ulcer be cauterized with a nitrate-of-silver pencil, or a solution of the nitrate of silver be placed for a number of days in the conjunctival sac of an eye with corneal ulcer, a deposit of the brown oxide of silver may take place in the corneal tissue. Such a deposit is very persistent and may give rise to irritation.

Forms of corneal affections due to neuroses and exposure, as in lagophthalmos, are not included under the title of this communication.

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# SCHOOL CLINICS

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Clinics are needed to give the eyes of school children the best supervision and help. In some ways they should differ from other medical clinics; but must use many of the same means for diagnosis.

A business man was indignant when charged as much for the measurement of his boy's eyes for glasses as for his own. He did not claim any rebate for allowing a cycloplegic to be used in the boy's eyes, or for keeping him out of school for two days. Apparently his surprise and indignation arose from the fact that he did not pay as much for his boy's shoes, or carfare, as his own. Evidently he did not think his boy's eyes were as important as his own, although they would be used forty years longer, and had greater defects. Possibly he remembered that he did not pay as much for the boy's schooling as for his club, or church. He settled the matter to the satisfaction of both parties by paying his bill—and then patronizing an optometrist.

Parents are slow to recognize any need for glasses for their children. If the child does not recognize something at a distance which they do, it is ascribed to lack of observation, or inattention. If the book is held too close, or writing is accompanied by frowning, or twisting the face, it is a bad habit the child has fallen into. Certain it is, that the presence of some eye defect is usually suspected by the teacher, before such a thing has been thought of by the mother. If children's eyes suffer from neglect, school authorities must give them some attention. Failure of parents to attend to the child's needs has called for laws compelling school attendance, and truant officers. The same kind of neglect has to be met by a school clinic.

There are many children who come to school, handicapped for school work by defective eyes. With such eyes they cannot get the full benefit of the common school. They cannot keep up with their classmates. Necessarily they become conscious of inferiority, without knowing why it is, or that any one else is to blame for it. They fail of promotion, drop back to a lower class, become "retarded" children, have to repeat the year's work, and are a source of increased expense to the school district. Aside from doing justice to such children, the community cannot afford this increased expense; or allow their deficiencies to become a permanent charge to be met by the public.

The school eye clinic is not a means for helping paupers; but for preventing pauperism. It should not be associated with clinics for the medical relief for the poor. It may well be held in one of the schools, or a school administration building. It might be associated with a school pediatric, or orthopedic clinic; or with the examinations given in connection with gymnasium work, or athletics. It is a health examination, but quite different from an inspection for signs of contagious diseases, and less understood than the search for impaired nutrition, or early tuberculosis.

The school eye clinic cannot be held for all children entering school. Those who need its care will generally have to be picked out by teachers, principals, school nurses, school physicians, and sometimes parents; often by a mere testing of vision, such as should be made of every child admitted to the schools. In the clinic material thus assembled, a very large proportion will be the refraction cases. But every child should be looked over for evidence of other congenital defects, and results of disease during infancy and early childhood. Although the child may not be sent on account of poor vision, his vision should also be tested by the clinic physician. Tests of vision have to be used in the measurement of eyes for glasses. The doctor making the first test has the opportunity of learning the child's mental attitude and ability to re-

spond to such tests as will help in the subjective testing of refraction. The original vision is the starting point of a scientific case history, and is valuable for comparison in all subsequent examinations.

After the first test should come an ophthalmoscopic examination. This reveals so much of all possible conditions in the eye, that it is essential, as well as time-saving. It can generally be made with the pupil undilated. But if there is any difficulty about this, or if such an examination leaves some important point unsettled, the examination can be repeated when the eyes are under a cycloplegic. With the electric ophthalmoscope it is possible to make a rapid examination, even in a restless child. Opacities in the lens may well be mentioned to the child; and also that an opacity of the cornea is not cataract. The word "cataract" has acquired a sinister significance through centuries of use as suggesting blindness, when many other causes of blindness were called "cataract." Better popular understanding about cataract will remove one of the resources of quackery. When the media have been inspected a general survey of the fundus can be made by quickly following out the central retinal vessels, branching in their various directions.

The things to be looked for are congenital anomalies, such as: partial albinism; pigment spots; traces of hyaloid remains; peculiarities of the optic disc, like Fuchs' coloboma; congenital pseudo-neuritis; colobomas of choroid, iris, or edge of lens. There may be traces of congenital opacity of the cornea, to be differentiated from the results of keratitis in early childhood, or hereditary corneal opacities, that may be found in several children of a family, and should be looked for in their parents. Embryotoxon, juvenile "arcus senilis," will be encountered in rare cases. In short, the routine examinations of the eyes of school children will bring us a knowledge of the natural history of disease; and the differentiation of juvenile conditions that cannot be attained outside the school clinic, because parents neglect the early needs of children's eyes.

But the great work for a school clinic is the correction of errors of refraction that constitute the common handicap and special danger of school life. This should be accurate, complete, and systematic, that the large number to be dealt with shall receive scientific and helpful service. Objective methods of measurement are rapid. In the school clinic the ophthalmometer can be used with benefit. In children's eyes the corneal often corresponds closely with the total astigmatism, in its principal meridians; and the old rule of deducting 0.50 or 0.75 D., will give nearly the real amount. The divergence of lens correction, from corneal readings, occurs chiefly in adult life. When regular astigmatism has been corrected the special error is more easily dealt with.

Skiascopy (retinoscopy) is the most important means of measuring refraction in the school clinic. Children are untrained in observation, and some of them unfamiliar with the forms of letters. The capital block letters are a form that they are least familiar with. Subjective testing is always slow, and with children, or illiterate adults, is less reliable than the objective test. It should not be omitted, but should be used to check, or confirm, the objective tests. Skiascopy should be used under the conditions and with the experience that makes it by far the most accurate objective test of refraction; and some of the essential conditions of accuracy are not emphasized, nor even mentioned in some of the popular textbooks on ophthalmology. Even some monographs on the shadow test quite ignore them as foundations of accurate testing.

The fundamental conditions of accurate skiascopy are: Dark adaptation of the observer's eye. This may be only necessary for the eye in use behind the mirror, but it must be perfect in the macula. Glancing for a few seconds at the source of light will spoil the adaptation for a minute, or longer; just as it does to look at the headlight of an approaching automobile when driving at night. This requires making the test in a dark room, not, as some writers have boasted they could do, in a light room. Claiming such exceptional knowledge

of the test, they have exhibited their practical ignorance of it. But it is not essential that the whole room should be absolutely dark. This is needed about the face of the child being tested, to see the light area that has to be thrown on the eye, and the light in the pupil when near the point of reversal. Enough light may be kept on the floor and lower part of the room to facilitate the changing of glasses, or seeing the numbers of the glass used.

For accurate skiascopy the source of light must be bright and small; bright enough to make the light area in the pupil distinct near the point of reversal and small enough to bring out the shape of the area that shows astigmatism. The important thing about the shadow test is that it shows astigmatism. Lindner emphasized this by calling his method "skiascopy with cylinders". The small filament lamps used for automobile head lights are the best source of light for skiascopy; such as are used in the Shahan lamp for operations, and the Shields lamp for demonstrating microscopic sections. The source of light should be near the observer's eye, so that the illumination will be good near the point of reversal. This is accomplished by bringing the light near the plane mirror. However, when the observer is one meter from the patient and the light near the patient's head the rays reflected on the eye have a divergence of one-half diopter, which differs only one-half diopter from what the divergence would be if the light were right at the mirror.

With skiascopy the astigmatism should be accurately measured. The subjective testing with test-letters then becomes largely a means of confirming the skiascopic findings; and starting with very nearly the accurate correcting lenses will require very little time. But the eyes of school children should be accurately corrected. The eyes are used with contracted pupils and the lenses chosen under cycloplegia should be tried after the pupils have quite returned to normal. For many eyes the visual zone is so regular that even with pupil widely dilated it chooses the glasses it needs by the subjective test. But in some cases the larger peripheral area of the pupil shifts the selection of the lens from that which would best correct the visual zone, to something of a compromise between it and the quite different refraction of the periphery. This effect has been blamed on incomplete cycloplegia, or "astigmic accommodation", something that has often been supposed, but never proved to exist. The differences in refraction in different parts of the dilated pupil have been observed in the great majority of eyes by every one who looked for it. Whatever the theoretic explanation of such differences, they are shown to exist in many eyes, and should always be considered to the extent of making a postcycloplegic test—using the part of the pupil that will have to be depended on for all eye work.

The complete success of the school clinic requires that the defects found in the eyes shall be removed, or remedied, so far as this is possible. Those who establish, or control, such a clinic should plan how to meet the needs of the individual child, and remove his handicap for school work. In many towns there are competent opticians who can supply the glasses needed; and can fit to the face the frames that will keep them properly before the eyes. The naming of such a person to parents and children, one who can be relied on to fill the prescription, and fit serviceable frames at a reasonable price, will be a real service to the clinic and the community. Arrangements should also include, whenever possible, furnishing at a reduced price, or without charge, the glasses for children who otherwise could not obtain this needed help.

If the school clinic is really a free service to the children, in most communities will be found individuals who can and will help by giving needed glasses to the children, who otherwise would be compelled to do without them. Even in scattered communities there are children who cannot gain the benefit of the common school, without correcting glasses.

The follow-up of the refraction of school children may be expected to be a means of gathering real information about the changes that occur in the eyes during the years of growth and de-

velopment. It is reasonable to make sure that the eyes are able to do what is expected of them, as often as it is customary to test whether the child has learned enough to be advanced a grade in the school system. But, with freedom from symptoms, many children can go several years without change of glasses. Certain children, however, should be seen every year, or even more frequently.

Those children who are starting to become myopic may need to have their glasses changed more than once; and the habit of getting the eyes too close to the book must be entirely eradicated, before the eyes will stop growing more myopic. In a few eyes astigmatism may change greatly during the years of growth, especially under the strain of much reading. Those whose vision cannot be brought up to standard will need watching. The higher grades in school are likely to need better sight than the lower. Those who may need more help should be warned of certain symptoms that are likely to arise. All who require the special methods of sight-saving classes should be seen every few months.

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## CHOICE OF OPERATIONS IN SECONDARY GLAUCOMA

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Operative procedures for glaucoma following various kinds of lesions of the anterior segment of the eyeball are discussed, giving the operation of choice, dependent upon whether the glaucoma is early or advanced, and whether injury to the eyeball is slight or extensive, dependent also upon the general condition of the patient. Read before the Connecticut State Medical Society, Section of Ophthalmology and Otolaryngology, May 26, 1932.

The term secondary glaucoma implies an increase of intraocular tension in a more-or-less-pathological eyeball. In almost all cases there is positive evidence that this increase is caused by a closure of the filtration angle. It is seen in cases of glaucoma following perforating wounds of the cornea, ulceration with prolapse of the iris, dislocation of the crystalline lens, wounds of the lens, and intumescent cataracts, as well as in the course of iridocyclitis, and during the growth of an intraocular tumor. Needless to say, since secondary glaucoma may follow an operative procedure, all means possible should be used to prevent its arising in the first instance. To this end an accurate knowledge of the local conditions, the utilization of all diagnostic measures, and a clean, deliberate procedure with careful toilet of the wound, are necessary. In addition to this, the general care of the patient must be adapted to his physical and mental state.

Sightless eyes, which may have become irritable and painful, or those that are the seat of a malignant tumor will not be considered in this paper. Enucleation is the only procedure and should be done early—in the former case to preserve health and improve the patient's economic status; in the latter, to save or prolong life.

The type of glaucoma and the stage of the disease, as well as the extent and position of the pathological changes in the eye, determine the type of surgical procedure that should be selected for the relief of intraocular tension, preservation of vision, of the visual fields, or even of the eyeball.

Early cases, in which local treatment with miotics, mydriatics, glaucosan, hot applications and purgatives, control of a diabetes or other systemic disease have proved of no avail; cases in which cellular exudates or hemorrhages have not yet organized; in which the pectinate ligament has not undergone structural changes of moment; in which the iris is active and quite healthy, offer the best assurance of operative success. It might be stated that success in surgi-

cal treatment decreases in direct proportion to the extent, position, age, and type of pathological changes present. In addition, one is impressed with the importance of good general health in the progress of recovery from any operative measure.

In this paper we shall consider cases of secondary glaucoma due to lesions

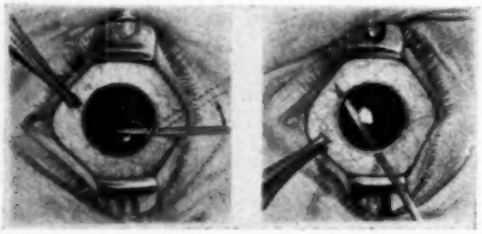

Fig. 1 (Weeks). Illustrates the procedure of cutting the iris in adherent leucoma of the cornea. (Duverger et Velter)

of the anterior segment of the eyeball: traumatic, perforating wounds, operative wounds made in the course of cataract extraction, or in discission of secondary membranes, or those following perforating ulcers of the cornea.

Incarcerations of the iris, if recent and central, involving the whole pupillary margin or a broad segment of it, may be freed with a spatula inserted through the original wound, and this should be followed by the instillation of atropine, plus the application of a conjunctival-flap covering (Van Lint type) to assist in the speedy refilling of the anterior chamber. This may be greatly aided by paralyzing the orbicularis muscle in order that lid pressure on the eyeball may be as slight as possible during the reparative process, which, by the way, is an excellent procedure in any operation where it is desirable that the anterior chamber be restored early. If not so recent, organization having taken place in the corneal wound, iris, and filtration angle, the glaucoma has usually been present long enough to have obliterated vision, and the object in operating is to save the eyeball or to relieve pain and irritation. If light projection is good and the eye is the only one that remains, enough vision may be restored to permit of the patient's getting about and to prevent his being entirely dependent. To cut the adhesions is quite useless. As Dr. Knapp has reported, there is a rapid reformation of scar tissue and even though an iridectomy may give a good opening between the anterior and posterior chambers, the filtration angle is usually irreparably damaged; hence, a filtering operation is advisable. Congestive cases, associated with exudate and cellular debris, require a 2 mm. trephine opening or a clean-cut Lagrange procedure followed by massage until the eye quiets down enough to prevent a plug of exudate from forming in the filtration opening. Even in cases where vitreous appears, Morax believes the filtering wound is useful and Collins made the observation that a wound in the corneo-scleral tissue, if constantly bathed by aqueous, shows little tendency to granulate and form scar tissue.

A man 33 years of age, wearing a low plus lens, was struck over the right eye with a cane in March, 1921. The glass cut an irregular wound through the cornea from the center downwards and out to the limbus. The wound was filled by prolapsed iris. This was replaced and a conjunctival flap applied over the

Fig. 2 (Weeks). Illustrates the type of leucoma of the cornea which does not yield to the usual cutting operative procedure. (Fuchs)

cornea. In eight days the flap had become displaced and the iris had prolapsed. The latter was excised after carefully freeing it from the wound margin, and a conjunctival flap again applied. In ten days the flap was off the cornea and the wound healed. A small tag of iris was caught in the lower limbic end of the corneal wound. Vision was 20/200; with a slit, 20/70+1. Six months later this eye was congested and painful, showing evidences of increased ocular tension and registering 50 (Schiötz). Miotics and hot compresses did

not relieve this tension. Vision was hand movements, visual projection good in all fields. At the end of a week without decrease of tension, a 2 mm. trephining was done above with a partial iridectomy. Good recovery was made so that in two months vision was 20/50 through a pin hole; ocular tension, 18; and the visual fields quite normal. Ten years later the same result obtains.

Peripheral wounds, or those near the limbus, with an iritic prolapse or incarceration are less apt to give trouble. The prolapse can be excised or even replaced. The incarceration, if small, needs no operative procedure, or, once it has become organized without inducing irritation or glaucoma, may be let alone. If glaucoma is induced from such conditions, the incarcerated iris may be cut through according to the technic of Schulek, Abadie, or DeWecker, or an iridectomy to one side of the adhesion may relieve the pull of the incarceration. The patients in these cases have been so fortunate as to be free from involvement of the lens capsule, cortex, or of the vitreous.

Failure of a wound to close promptly after cataract extraction may be an indication of a possible incarceration of lens capsule or vitreous. Such a wound may close slowly and if the area around it is not examined with a loupe or slitlamp, the incarceration may go unsuspected until the iris is drawn forward and becomes adherent to the posterior corneal surface, or a low-grade iritis or an iridocyclitic exudate closes off the filtration angle causing glaucoma. This condition appears in traumatic cases with perforating wounds of the cornea, and after discissions, if the vitreous follows the knife into the corneal wound. A careful slitlamp study will reveal the extent and position of the incarceration. If early, cutting across these bands may relieve the situation, provided the anterior chamber is not lost or refills promptly. This can be done with a Ziegler knife under a conjunctival flap. Vitreous may come forward between the cut ends. Should semi-jell-like vitreous flow into the anterior chamber the filtration angle will be blocked. If the vitreous is fluid this need not occur. In any event, a trephine opening of 2 mm. will take care of the tension and in the former case a posterior sclerotomy aids in keeping the vitreous away from the filtration opening. Should the case be of some standing, having a definitely altered filtration angle, a trephine or Lagrange sclerectomy is indicated.

In a case of posterior synechiae with iris bombé, an iridectomy may rapidly

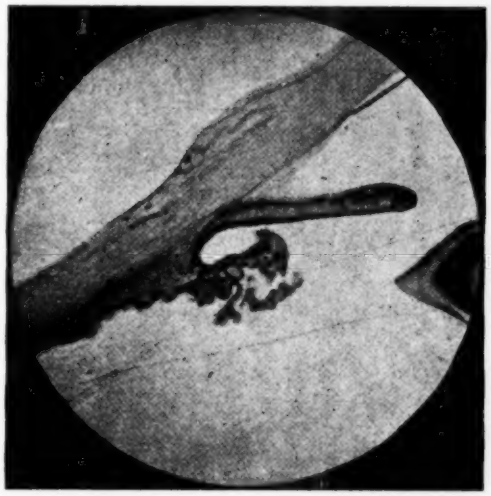

Fig. 3 (Weeks). Illustrates Kneis angle which necessitates a filtering operation. (Lagrange)

relieve the glaucoma. Curran brought out an iridotomy with double puncture of the iris to establish communication between the anterior and posterior chambers. I have not tried this, mainly because an iridectomy has sufficed to relieve all possibility of recurrent irritation and the formation of further plastic exudate, which, induced by the efforts of the iris at the pupillary margin to contract and dilate, would drag on the adhesions present and so set up a congestive state. Cases of this type occur when hyper-tension has developed in the presence of an atrophic iris that is ballooned forward and caught on the remains of an after-cataract, near the puckered part in the pupillary margin. The following are illustrative cases:

A youth of eighteen years had suffered a perforating wound of the cornea injuring the lens early in life. There was good light projection in all fields except upward and nasally. The eye at times would become sensitive

to light, congested, and lacrimose. When first seen in 1923 the tension was 17, but under observation in the course of two months the tension rose to 45 and the eye was irritable. An iridectomy was done nasally and below, this being the area of the most healthy looking iris, and the capsular membrane cut at the same time. Reaction was moderate, the capsule cut fell together. Two months later another discission with a Ziegler knife was accompanied by much hemorrhage from the vascularized membrane. Two months later a Wheeler discission was made with but little reaction. After quieting down the eye gave 20/50 vision with the correction of a +12.00 D. sphere.

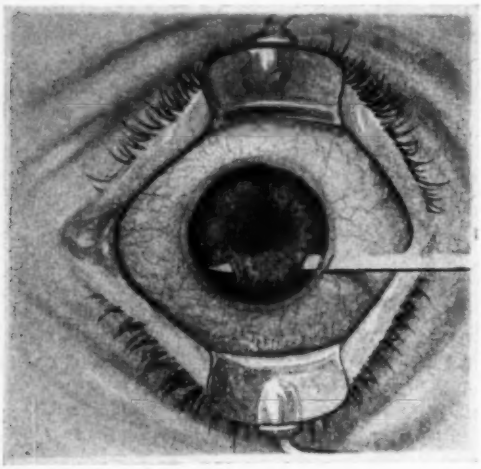

Fig. 4 (Weeks). Shows the Curran procedure in cases of iris bombé. (Duverger et Velter)

A man aged forty-eight years, had had a simple cataract extraction in Paris in October, 1926. The eye never really quieted down. When seen two months later it was sensitive to light and there was much tearing. Vision was not clear, yet with a +11.00 D. sphere it was 20/20. The visual field was normal; ocular tension also normal. The pupil was oval up and in. A light pericorneal blush was observed but the cornea was clear. The iris reacted sluggishly. A few cellular floaters were seen in the anterior chamber, otherwise the media were clear and the fundus in good condition. Three months later the patient returned from the South with acute pain in his eye. Vision was hand motion; the ocular tension, 44. Atropine had been used by his physician to combat the iritis. Light projection was good. The iris was found to be incarcerated in the wound. There was exudate and blood in the anterior chamber and a membrane in the pupillary area. Under a conjunctival flap the previous wound was opened, the iris freed, and an iridectomy done. At the same time a discission was made in the pupillary membrane. Recovery was stormy, lasting two weeks, the eye remaining soft. Deposits were seen on the posterior corneal surface. Part of the nasal pillar was caught in the wound. The media were hazy and vision only 20/200 with good light projection. As the patient was to leave for France he was directed to see Dr. Morax. A report of the subsequent history is as follows:

The eye slowly cleared until a vision of 20/50 had been obtained. In six months there was an acute flare-up of tension and local treatment failed. A sclerecto-iridectomy was done at one side. The eye quieted somewhat but developed corneal bullae which recurred frequently enough to be annoying. Vision failed and the patient finally desired enucleation. The pathological specimen showed an epithelial cyst of the anterior chamber.

With crystalline-lens changes, an intumescence may appear during the development of a cataract or following an injury without escape of cortex into the anterior chamber. It may press the pupillary border of the iris against the cornea and interfere with the normal outflow of aqueous. An iridectomy usually lowers the tension by opening the communication between the anterior and posterior chambers. The swelling of the lens subsides and the latter can be extracted later on with safety. The swelling of a hypermature lens may act in the same way although if there is a leakage of morgagnian fluid an irritative iritis or iridocyclitis may complicate matters. The same procedure is adopted. The iridectomies must be well posterior as to position, and broad, particularly in old people, or when the iris is atrophic.

Following perforating wounds of the lens, or needling, or following a capsulotomy with much soft cortical remains, filtration may be blocked, especially if the anterior chamber is narrowed and there are sclerotic changes in the pectinate ligament. A linear extraction and washing out of the cortical material is usually successful in relieving the glaucoma in these cases. Should vitreous be present through a rupture of the zonular fibers or posterior lens capsule, little can be done, save, perhaps, a posterior sclerotomy, thus deepening the anterior chamber a bit, together with methods for stimulating the lymph and blood flow in the anterior segment by the use of dionin followed by hot compresses.

When glaucoma follows dislocations of the lens into the anterior chamber, spontaneously or due to trauma, extraction of the lens brings relief. A conjunctival flap is made, the knife inserted at the limbus above, the incision enlarged with a Stevens scissors, and the lens removed with a loop inserted behind it. If the lens tends to slip back into the vitreous chamber it can be transfixed before making the incision by means of a narrow knife needle through the limbus or through the sclera back of the ciliary body and through the pupillary area. An iridectomy may be done if the iris tends to prolapse, or a peripheral nick may be made in the iris sufficient to prevent its prolapsing. Eserine should be used for four or five days. In these cases it is the vitreous and ciliary processes coming forward which push the root of the iris forward, closing the filtration angle. A posterior sclerotomy may help the operative procedure, if the lens is transfixed, by deepening the anterior chamber and allowing the vitreous to settle back out of the way.

In 1925 a man aged forty-one years, was examined, who, twenty years previously, when applying for a position on the police force, had been rejected because of a growth in the left eye. He had had diplopia at the age of thirty years and was treated for it in the Knapp Memorial Hospital. Examinations of blood, for tuberculosis, and dental—were negative. An iridectomy had been done for secondary glaucoma in the left eye. Two years later a cataract developed in this eye. Drops and subconjunctival injections had been used in the effort to dissolve it. Six months ago, while swimming, he felt pain in the eye. Under my observation the eye was red for three weeks, but the pain disappeared. There was no light perception. A broad coloboma was seen above, together with a cataractous lens that moved, filling the coloboma. The iris was tremulous and there was circumcorneal injection without cellular deposits on the posterior corneal surface. Ocular tension was 18 (Schiötz). The right eye was normal. After instilling eserine into the diseased eye a conjunctival flap was made and three sutures placed. A short limbic incision was enlarged. Vitreous appeared in the wound but on holding the flap forward and up, it receded. The lens was removed with a loop; no vitreous escaped. Recovery was uncomplicated. The tension remains normal, the media are clear. When last seen five years ago, the optic nerve was atrophic with glaucomatous cupping.

In 1927 a woman fifty-five years of age, sent by an ophthalmologist, had a congestive secondary glaucoma in the right eye, with a cataractous crystalline lens, subluxated downward and outward. Vision was 2/200, tension 32, the cornea steamy. Miotics, hot compresses, catharsis, and a sedative reduced the tension to normal within three days. Vision came up to 20/30; the visual field had a good outline. There was no cupping of the optic disc. Three days later tension was 50 (Schiötz), vision only light perception. An iridectomy, without complications, relieved the tension. With the slitlamp the vitreous was seen bulging around the lens above and nasally. Two weeks later the lens was removed with moderate loss of vitreous, using a conjunctival flap and loop extraction. After one month, vision with correction was 20/40+2; tension 17 (Schiötz). There were a few vitreous opacities but no cupping of the optic disc.

A cataractous lens dislocated backward should be let alone unless it causes irritation and a secondary glaucoma. Should removal be necessary as in the case just related, it can be removed with a loop with loss of fluid vitreous but good results.

Secondary glaucoma due to inflammatory change in the iris, ciliary body, and choroid is not infrequent. Recent cases in which no organization has occurred are often relieved by paracentesis, repeated whenever the ocular tension rises, until the freed angle can take care of the aqueous flow. This procedure evacuates the cellular aqueous, empties the anterior chamber, permits the use of atropin to free an iris adhering fast to the lens capsule, and puts the iris at rest, lessening the congestive process with cellular and fibrinous exudate. Care should be taken in instilling atropin in patients over forty years of age. Paracentesis should be done with a cataract knife or keratome, making a corneal wound 2 mm. long in the upper and outer third of the cornea, 3 mm. from the limbus. This procedure if done through the cornea with an active or atrophic iris, unsecured by posterior synechiae, is apt to be followed by prolapse of the iris.

A woman forty-seven years of age, was seen in 1930. Vision had been blurred for one week and there was a feeling of pressure over the right eyebrow with tearing and sensitiveness to light in that eye. Vision with correction was 20/30 O.D. The patient read Jaeger No. 1 at 22 cm. Tension was 55 (Schiötz). The right cornea was insensitive, showing

cellular deposits posteriorly, the pupil was small, and the iris reacted sluggishly. The anterior chamber was moderately deep, light sense was reduced, and the fields were normal in outline. There was no involvement in the left eye. All tests proved negative. There was a suspicion of tonsillar infection although the patient remembered no activity. Catharsis and local hot baths brought no relief of tension. After four days a paracentesis was done and most of the cellular deposits washed out. The corneal wound was opened on the following day. One week later the tension had come down to 20 (Schiötz). Dionin (2 percent) and hot compresses were used twice daily. The cornea and anterior chamber cleared, although cellular floaters were seen in the latter by means of the slitlamp. Vision with correction was 20/20. Nine months later there was a recurrence, vision was reduced to 20/40, and the tension was 62 (Schiötz). Paracentesis was refused. The tonsils were removed and the tension came down soon after and has stayed within normal limits, although the cornea is studded with cellular deposits that interfere with good vision.

A man, fifty-two years of age, appeared at the Bellevue Hospital in 1930, having acute glaucoma in the left eye, which also showed evidences of a cyclitis. Vision was light perception; light projection was good. Tension was 55, the cornea steamy, the pupil small, the iris inactive. All tests were negative, as were also the teeth, nose, and throat. There was a questionable gastro-intestinal infection. Hot applications, catharsis, and sedatives brought no relief. Paracentesis was done with instillation of atropin, and the corneal wound kept open one week. Although the pupil was dilated and congestion had somewhat subsided, the tension remained up. A Lagrange operation was done. For two years the tension has remained normal; there is a central corneal haze with a few posterior corneal deposits. The outline of the visual fields is notched, upward and nasally. Vision is 20/40. The optic disc shows some atrophy with cupping.

Another type of case is that due to an irido-cyclitis associated with interstitial keratitis of specific origin, as illustrated in the following history:

A woman, forty years of age, was seen in 1919. There was an old interstitial keratitis with dense corneal scarring. Fine deposits could be made out at the periphery below. The blood Wassermann was negative. Vision was 4/200 O.U. The visual fields had a good outline; tension was 31 O.U. The anterior chambers were shallow, the pupils reacted sluggishly. The patient thought her vision was getting worse. There was a great deal of tearing. A bilateral Lagrange operation was done, after local and general treatment over a ten-day period had failed to bring relief of the condition. One month later vision was 20/200 O.U.; ocular tension, 22 O.U. This continued for two years, then subacute attacks of glaucoma yielding to local treatment began to occur once or twice a year. When last seen in July, 1931, the ocular tension was 18 O.U.; vision, O.D. was 6/200, O.S. was 3/200, unimproved. The visual fields showed glaucomatous cupping.

Cases of buphthalmos according to Morax, Lagrange, Elliot, Beard, and Török do poorly with iridectomies because the subsequent complications—dislocation of the lens, retinal detachment, and intraocular hemorrhage—usually lead to the loss of the eye. If done at all iridectomy should be done early before much enlargement of the eye or an extensive pathological change has taken place. Beard recommends cyclodialysis because of the slow reduction of ocular tension, usually comprising forty-eight hours or more. No complications arise, but most operators find this procedure temporary. Cases in which we have used this method, mostly cases of absolute glaucoma, have been but temporarily helped. Elliot advocates the trephine and this we find gives encouraging results, especially if the eyes are not too far gone pathologically.

A boy aged three months was seen in 1920. There was tearing and photophobia. The eyes were large, the corneae 13 by 14 mm. in size. There was a central haze in both eyes. The pupils were small, the irides inactive, tension ++ to the fingers. Pilocarpine (1 percent three times a day) gave no apparent relief of symptoms. A bilateral trephining was done above with complete iridectomy. One month later the trephine openings were filtering; the right cornea was clear, the left still hazy with wrinkles in Descemet's membrane. Tension in the left eye was ++ to the fingers, but stayed down with pilocarpine drops. Two years later an infection of the conjunctiva, involved the bleb and the anterior chamber of the left eye. This gradually subsided leaving an area of thickened filtering bleb. Three years later the tension was 1+ with tearing and photophobia of the left eye; the right eye was doing well. The left eye could be kept under partial control with miotics. Four years later a Lagrange operation with iridectomy was done. The tension remained down with some clearing of the cornea, showing the presence of cyclitic deposits. One year afterwards the tension in the left eye was up, there were photophobia, a hazy cornea, and a tremulous iris, which yielded to miotics. One year later the patient struck the left eye, rupturing the globe at the limbus above, with subsequent hemorrhage into the eyeball. The eye became soft and irritable, and light perception was lost.

An enucleation was done. The right eye to date, twelve years after the operation has remained in good condition. Vision equals 20/200, the patient reading Jaeger No. 3 close to the eye. The boy was in a sight-conservation class for a time but is now in a grade school and keeps up with his class.

To sum up: Recent prolapses or incarcerations of the iris can sometimes be replaced, but more often must be excised with careful replacement of the iris pillars. Old, organized incarcerations should have an iridectomy done to one side or where no vitreous can induce complications, using a trephine or Lagrange operation, especially when the filtration angle is permanently damaged. Crystalline lenses in the anterior chamber should be extracted with or without iridectomy, depending upon the tendency of the iris to prolapse. Secondary glaucomas after iridocyclitis may, if caught early, have a paracentesis or an iridectomy, if necessary; older cases, a 2 mm. trephining with broad iridectomy or a Lagrange sclerecto-iridectomy. Buphthalmos cases are likely to do better after corneoscleral trephining.

The cases cited are more or less favorable ones. Knowing what these secondary glaucomatous eyes have suffered from being the site of pathological changes, will incline the operator to regard each case as a law unto itself. Operative procedures are dangerous and are quite likely to be followed by complications. The beneficial results may not be immediate but slow, yielding sufficient visual function to be of help to the patient in getting about.

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# THE OPHTHALMIC HOSPITAL AT MADRAS

## An historical note

LIEUT.-COL. R. E. WRIGHT, M.D., I.M.S.

**This sketch was prepared by the Superintendent for the professional report for the year 1931. It gives interesting data with reference to his predecessors.**

The Government Ophthalmic Hospital was originally established in Royapetta as the Government Eye Infirmary in the month of July, 1819, by Surgeon Robert Richardson on behalf of the Board of Directors of the East India Company. We have no knowledge of its location in Royapetta, possibly somewhere near the back of the Madras Club, or the old Surgeon-General's office. It evidently was a temporary arrangement, as it held good for only a year.

Treacher Collins, in his book "The History and Traditions of the Moorfields Eye Hospital," writes as follows:

"As already mentioned Travers held the appointment of surgeon in London to the East India Company. In 1819 its Honorable Directors became impressed by the great prevalence of eye disease in the large and populous districts over which they ruled, and applied to Travers in the matter. He pointed out to them the excellent results which had followed the establishment of the Eye Infirmary in London, and that similar institutions might be started in India. This advice was accepted, and Mr. R. Richardson, one of the Company's surgeons, who had studied ophthalmology under Travers, was sent to Madras, where he founded the Madras Eye Infirmary, which was each year resorted to by increasing numbers of patients. The Infirmary has been several times enlarged, and in 1888 its name was altered to that by which it is now known, The Government Ophthalmic Hospital.

"Stimulated by the success which attended the establishment of the Eye Infirmary at Madras, the East India Company determined to start similar institutions in other provinces. In 1824, two other surgeons who had studied at the London Eye Infirmary were sent out to India for this purpose; Mr. Jeafferson went to Bombay and Mr. C. J. Egerton to Calcutta, where each of them founded an Eye Hospital."

We also read in this work that the Eye Infirmary in London, now known all over the world as "Moorfields" was established in 1805. It was not only the parent of the three eye infirmaries in India, as shown above, but also of the New York Eye and Ear Infirmary (opened 1820), and the Eye Infirmary in Exeter, both of which retained the title "Infirmary." The institutions in Calcutta and Bombay are today named respectively the Eye Infirmary Medical College Hospitals, Calcutta, and the Sir C. J. Ophthalmic Hospital, Bombay.

We read in Crawford's "Roll of the Indian Medical Service" that Richardson was a surgeon-mate of the "ceres" 1802-03, was surgeon in the "canton" 1804-05, became assistant surgeon in July, 1805, and full surgeon in February, 1819. Apparently he was promoted to full surgeon when he took over the organization of the eye clinic in Madras. He died in Madras on the 31st of May, 1824.

In June, 1820, the Infirmary was transferred to the site occupied by the present Madras Volunteer Guards Institute, Vepery, close to the Perambur Barracks. There are people still living in Madras who remember the institute in the days when it was still used as a hospital, but we cannot find out to what extent the eye clinic there was developed.

On Richardson's death in 1824 Thomas Moore Lane took over the Infirmary and the position of surgeon-oculist to the Madras Establishment of the East India Company. Lane was born in 1797, and got his M.R.C.S. in 1820, became assistant surgeon in January, 1822, and full surgeon in Novem-

ber, 1833. He got his F.R.C.S. in 1844, and died at Madras in the same year. Lane was very young, being twenty-seven years old when he first came to Madras as surgeon-oculist in charge of the Infirmary. He was also Private Secretary to the Marquis of Tweeddale, Governor of Fort St. George. At the time of writing it is not certain for how long he was Private Secretary to the Governor, but he was in charge of the Eye Infirmary during his whole service.

He was succeeded in 1844 by a man named Thompson. Whether this was James Thompson, who was born in 1820, took his M.R.C.S. in 1841, became assistant surgeon in 1842 and died in Coimbatore in 1854, or William Boxwell Thompson, who was born in 1808, became assistant surgeon in 1832, full surgeon in 1849, and died in Wexford in 1854, we are not certain.

Thompson was succeeded by a Dr. Shaw in 1851. Again it is uncertain which of the Shaws on the Madras establishment was in charge of the Infirmary. It was presumably either Henry Thompson Shaw, who was born in 1830, took his M.R.C.S. in 1851, became assistant surgeon in 1853, full surgeon in 1864, surgeon-major in 1873 and who retired in 1880; or James Shaw, who was born in 1809, obtained his M.R.C.S. in 1832, was naval surgeon from 1831-32, assistant-surgeon in 1834, full surgeon in 1851, got his F.R.C.S. in 1853, became surgeon-major in 1860, D.I.G. in 1863, I.G. in 1864, Principal I.G. in 1866, and retired in 1876. It is most probable that it was James Shaw, as he was promoted to surgeon in 1851, and the date on which the Shaw who was in charge of the Eye Infirmary took over is known to be 1851.

Following Shaw, Dr. Paul took over in 1857. Paul was born in 1827, took his M.A.K.C. (Ab.) in 1845, M.D. (Ed.) in 1848; L.R.C.S. (Ed.) in 1848, became assistant-surgeon in 1850, full-surgeon in 1864, surgeon-major in 1870 and retired in 1876. He must have been an assistant-surgeon whilst acting in the appointment.

He was succeeded in 1862 by Dr. George Smith. He was born in 1822 took his M.D. (Ed.) in 1843, became assistant-surgeon in 1844, full-surgeon in 1862, surgeon-major in 1864, D.S.G. in 1875, S.G. in 1876, and retired in 1880.

William Nathan Chipperfield succeeded Smith in 1869. He was born in 1822, took his M.R.C.S. in 1854, L.S.A. in 1854, became assistant-surgeon in 1855, full-surgeon in 1867, and died in Madras in 1873.

He was succeeded by Michael Cudmore Furnell, who was born in 1829 took his M.R.C.S. in 1851, became assistant-surgeon in 1855, full-surgeon in 1873, surgeon-major in 1877, brigade-surgeon in 1880, D.S.G. in 1881, S.G. in 1885 and retired in 1886. He was the author of the following books: (1) From Madras to Delhi and Back, 1874; (2) Water in Connection with Public Health, 1884; (3) Cholera and Water in India, 1886.

On Furnell's retirement in 1873, E. F. Brockman took over. (He afterwards became E. F. Drake-Brockman in 1881.) Brockman was born on April 20, 1843, took his M.R.C.S., L.R.C.P., became assistant surgeon in 1866, full-surgeon in 1873, F.R.C.S. in 1878, surgeon-major in 1878 brigade-surgeon in 1890, and retired in 1894. He was a member of the Medical Board, India Office, from 1897 to 1900.

He was succeeded by Surgeon-Major T. H. Pope, who was born in 1853, took his M.B., C.M. in 1877, and M.D. in 1888, became surgeon in 1878, surgeon-major in 1890, obtained F.R.C.S. in 1896, and became Surgeon-Lieutenant-Colonel in 1889. He retired in 1904 and died in 1920. He served in Afghanistan from 1878-80.

Major Robert Henry Elliot followed Pope. He took charge in 1904, became Lieutenant-Colonel in 1912 and retired in 1913. During his Superintendency the hospital was greatly enlarged and vast improvements were made in organization. Plans were laid and apparatus secured for the practice and teaching of ophthalmology on an extensive and up-to-date scale.

He was succeeded by Major Henry Kirkpatrick in 1914 after an interreg-

num during which Major W. C. Gray acted. Major Kirkpatrick was promoted to Lieutenant-Colonel in 1918 and retired in March, 1920. The plans laid by Colonel Elliot matured and advanced under Kirkpatrick's direction; and just before his retirement he opened the Elliot School, a new block devoted to the teaching of Ophthalmology.

The two last mentioned are still at work in London. Their names are familiar in recent ophthalmic literature. The present Superintendent succeeded Kirkpatrick as a Brevet-Major. He took over in March 1920, was promoted to Lieutenant-Colonel in 1927, and still occupies the position.

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## NODULAR DEGENERATION OF THE CORNEA

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The slitlamp reveals this condition when even the loupe fails to discover its earliest manifestations. Nine cases observed in three generations of a family affected by the disease are reported, with a confirmation of the observation that both the nodular and latticelike forms may occur in one family. From the Department of Ophthalmology, University of Nebraska, College of Medicine, Omaha, Nebraska. Read before the Colorado Congress of Ophthalmology, Denver, Colorado, July 22, 1932.

In 1890, Groenouw[1] reported two cases of a peculiar, bilateral, corneal disease under the name of "Knötchenförmige Hornhauttrübungen," which he described as follows: "The disease consists in the development of numerous small, rounded or irregular, gray, discrete opacities in the otherwise clear corneal tissue. The larger opacities attain to a diameter of about ¼ mm., and between these lie many smaller, dustlike gray points. The spots are situated chiefly in the central region of the cornea and leave the margin more or less free. The larger nodules raise the epithelium somewhat and thus give an irregular curve to the corneal surface. The opacities appear to form gradually without inflammatory reaction, and they remain unchanged for years."

Eight years later he[2] recorded his findings in a microscopical examination of a small superficial piece excised from the cornea in his second case. He found a foreign substance deposited in patches in the superficial strata of the substantia propria, sometimes just beneath the epithelium but never within it. With the hematoxylin-eosin stain this was found to be acidophilic, probably of a hyaloid nature. The nuclei of the corneal cells were slightly increased in number in the vicinity of the foreign deposits. There were no marked changes in the epithelium. Bowman's membrane was mostly missing. There were no signs of inflammatory processes.

One is impressed by the accuracy and completeness of his original observations for little can be added to his description except what has been revealed by examination with the slitlamp and corneal microscope. However, in a later article[3] he did add that the process was slowly progressive, that by fusion of several opacities irregular figures occurred, and that in the course of years fresh spots would continue to form.

In the same year that Groenouw's original article appeared, Biber[4] described a similar degenerative condition of the cornea under the name of "Gittrige Hornhauttrübungen" or latticelike corneal opacities. Similar cases were described in 1899 by Haab[5] and Dimmer[6]. In 1902, Fuchs[7] first called attention to the similarity of these two diseases. Three years later Doyne and Stephenson[8] reported seven cases of bilateral central degeneration of the cornea in three generations of a family in which some cases belonged to the latticelike and others to the nodular variety, and they concluded that these were only different manifestations of

the same process. They pointed out that both conditions are bilateral, begin about puberty, show no inflammatory reaction, and are slowly progressive. In both, the sensibility of the cornea, particularly as regards the central region, may be impaired and finally, both conditions tend to run in families.

Groenouw[3] himself, considered them to be closely related and really transition forms. Finlay[9] found both types in the same family. Fleischer[10] stated that the nodular disease was inclined to form into the reticular type by fusion of the foci. Gutzeit[11] reported an alternating occurrence of nodular and reticular degeneration in the same family. Uthoff[12, 13] and Pillat[14] have described a mixed variety of the two types.

An interesting family is recorded by E. V. Srinivasan of Madras[15] in which a mother with the latticelike type had three children, two of whom presented the nodular type and the third child, with a macroscopically clear cornea, showed a "superficial punctate keratitis, the curdy spots being mostly on the corneal nerves."

The familial and hereditary incidence of nodular degeneration was apparently unnoticed at first. However, Fuchs[7] in 1902, noted that two of his patients were brothers. In the same year Marcus Gunn[16] reported four cases in a family of ten, and in 1904, Spicer[17] recorded a family in which three generations were affected.

In 1917, Groenouw[3] recorded the genealogical tree of the descendants of his first patient by two marriages. Among the descendants by the first marriage, two daughters and a granddaughter, and by the second marriage, one daughter were found to be affected.

Many similar pedigrees have been reported, but I wish to add the following because it presents several interesting features. Nine cases in three generations are reported (fig. 1).

Case 1. Mrs. A. M., aged 69 years, housewife, gave a history of having "good eyes" until her 45th year. Since then her vision had gradually failed and numerous attempts to improve it with glasses had been unsuccessful. Her general health was good. Her father had good eyes until his death in advanced years. The condition of her mother's eyes was unknown since she had died when the patient was a child. She had two older brothers dead, but stated that they had no similar eye trouble. A son of each, aged 49 and 42 years, was examined and found to have normal corneae. An older sister was not examined. In two younger sisters, one was affected

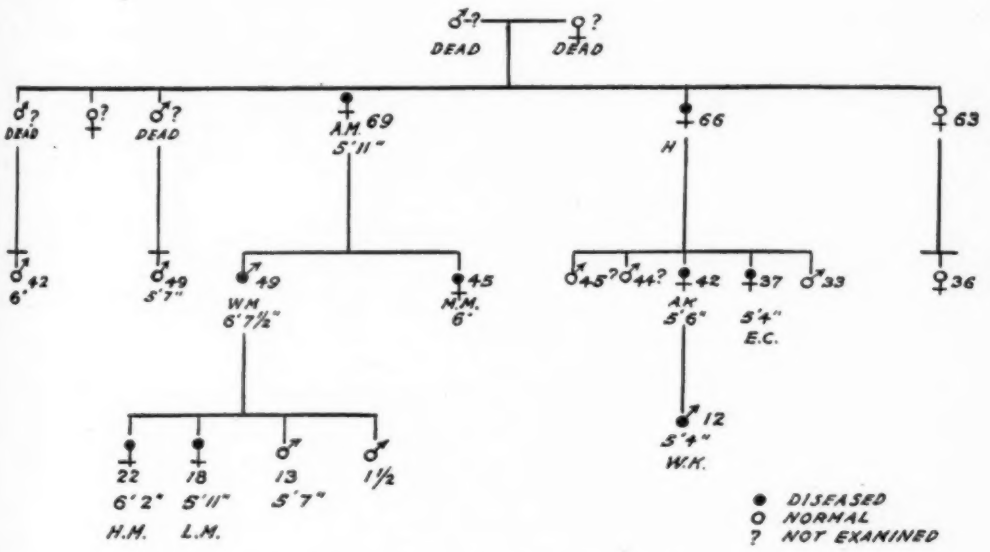


Fig. 1 (Judd). Pedigree chart of nodular degeneration of cornea.

and one not. She was the tallest in her family, measuring 5 feet and 11 inches in height.

Examination showed that her vision was reduced to 12/200 in the right eye and to 10/200 in the left eye; not improved with glasses. With the loupe, the central region of each cornea was found to be studded with numerous grayish, irregular opacities, so closely

Fig. 2 (Judd). Appearance with narrow beam showing irregularity of surface and position of opacities. Case 1.

grouped as to appear confluent in areas. They varied in size from ¼ mm. to the limit of visibility and were more numerous in the center. The larger ones raised the surface enough to give it a nodular appearance. The areas were quite symmetrical but more of the left cornea than of the right, was involved. The areas were subcentric, the center of the area being below that of the cornea, corresponding to the interpalpebral zone. The periphery was entirely clear.

With the slitlamp (fig. 2) the largest opacities were seen to be chiefly below the epithelium and definitely elevating it. However, there were some large opacities located in the deeper layers, even to Descemet's membrane. Between these larger opacities were many fine, grayish dots giving the stroma a stippled appearance. The nerve fibers appeared thickened but no definite relation between these and the opacities could be found. The corneal sensibility was greatly reduced. There was a slight thinning of the cornea as in beginning conical cornea.

Case 2. W. M., aged 49 years, farmer, son of the patient in Case 1, had noticed failing vision for two or three years. He had occasional headaches around the eyes, which easily became irritated. His general health was good. His height was 6 feet 7½ inches.

Vision was O.D. 20/50, O.S. 20/40. In the subcentric or interpalpebral zone of the right cornea were numerous typical opacities, while in the left, there were only a few (20-30) scattered, larger opacities. The corneal surface was smooth and the sensibility was normal. Ocular fundi were normal.

Case 3. M. M., aged 45 years, unmarried, daughter of patient in Case 1, reported that her vision had been gradually failing since she was about 25 years old. Her eyes become irritated easily. She had had several attacks of inflammation in both eyes, the last one

Fig. 3 (Judd). Appearance with narrow beam showing regularity of corneal surface, position of opacities, and stippling of anterior layers. Case 3.

several years ago. Her general health was good; her height 6 feet.

Vision was O.D. 20/70, O.S. 20/200; with glasses 20/70 in each eye. The central region of each cornea presented the typical opacities occupying all but the peripheral zone about 3 mm. wide, the largest were about 1/5 mm. Although the affection was quite marked, the surface was perfectly smooth and

there were no nodular elevations. Several of the opacities coalesced to form slightly broken lines. With the slitlamp (fig. 3), the opacities were seen to be flat plaques in layers parallel to the surface. Some were quite small and round, others were larger with dendritic extensions giving the appearance of deposits in the lamellar spaces. A few were circular with clear centers. The larger opacities were located chiefly just below the epithelium and in the outer third of the stroma, but they were present in the whole thickness of the cornea. The nerve fibers were slightly thickened, but the capillary loops at the limbus were normal. The cornea was of normal thickness. The corneal sensibility was greatly reduced. The ocular fundi were normal. Wassermann test was negative.

On November 25, 1931, a subconjunctival injection of 20 minims of a 5-percent solution of dionin in cyanide of mercury (1-5000) was made in the left eye, and one week later in the right eye. She has instilled a drop of a 5-percent solution of dionin in both eyes each day since then. Three weeks later her vision was 20/40 in each eye. However, after three months her vision was 20/50 in each eye. Moderate mydriasis produced by one drop of a 3-percent solution of ephedrin each morning was a distinct help.

Case 4. H. M., aged 22 years, daughter of patient in Case 2, complained of vision gradually failing for the past four years. General health was good. Height was 6 feet 2 inches.

Vision was O.D. 20/200, O.S. 4/200, improved with correction to O.D. 20/50–2, O.S. 20/40. Both corneae presented typical opacities in the subcentric area surrounded by a clear peripheral zone about 4 mm. wide. In the right eye the larger opacities were arranged in a ring, leaving the pupillary area quite free, but in the left eye they were quite uniformly distributed. Most of the irregular plaques were just beneath the epithelium but a few were in the deeper layers, which were stippled with the grayish dotlike opacities. The nerves appeared unusually prominent and slightly thickened. The limbic capillaries were normal. The surface was not irregular and there was no change in the thickness of the cornea. Corneal sensibility was normal. The ocular fundi were normal. After using a 3-percent solution of dionin for five months, the corrected vision was O.D. 20/30+3, O.S. 20/30.

Case 5. L. M., aged 18 years, sister of patient in Case 4, had never had any eye symptoms. Her height was 5 feet and 11 inches. The cornea appeared normal even with the loupe and oblique illumination. However, with the slitlamp (fig. 4), the right cornea presented a definitely stippled appearance with a few fine linear opacities in the stroma. The stippling was much more pronounced in the central region and extended throughout the entire thickness of the cornea. It was densest in the subepithelial region and just temporal to the exact center of the cornea. The left cornea presented a similar appearance with the densest part over the temporal half of the pupil. The limbic capillary loops were normal. The corneal nerves were quite prominent and slightly thickened. The corneal sensibility was normal.

Fig. 4 (Judd). Appearance with narrow beam showing absence of large opacities but stippling of anterior layers. Case 5.

Two younger brothers of the last two patients, aged 13 and 1½ years, showed no involvement. The height of the former was 5 feet and 7 inches.

Case 6. Mrs. H., aged 66 years, sister of patient in Case 1, gave a history of

poor vision since childhood. She presented findings similar to those described in Case 1, except that in her the opacities showed a tendency to form into lines.

Case 7. Mrs. A. K., aged 42 years, daughter of patient in Case 6, complained that she had had "bad eyes" since childhood and that her vision was gradually getting worse. During the last two years her eyes had been easily

Fig. 5 (Judd). Appearance with wide beam showing the irregular outline of the opacities. Case 7.

irritated by dust. Her general health was good, her height 5 feet 6 inches, and her weight 178 pounds.

Examination showed her vision to be 20/200 in each eye, not improved by glasses. In the lower central region of each cornea there were typical opacities occupying areas of 7 mm. in diameter. In the right eye there was a definite grouping of the opacities so that the denser part formed a ring 2 mm. wide around the pupillary area. Inside this ring were many small opacities but outside of it the cornea was perfectly clear. In the left eye the opacities showed more of a tendency to coalesce, forming irregular areas (fig. 5), many of which were circular with a clear center. A few opacities were quite deeply situated in the stroma even to Descemet's membrane. The corneal surface was smooth and no abnormality of the corneal nerves or limbic capillaries was present. The corneal sensibility was reduced in each eye, but more in the left eye. The ocular fundi were normal.

Case 8. Mrs. E. C., aged 37 years, sister of patient in Case 7, had a history of gradually failing vision since childhood. Height 5 feet 4 inches, of a short stocky type. She had been seen by Dr. Harold Gifford twelve years ago, at which time corrected vision was still 20/30 in each eye. A notation was made that she had "numerous fine opacities in the corneae of both eyes". The ocular fundi were normal. Examination showed her vision to be O.D. 20/70, O.S. 20/200. The corneae presented typical opacities except that these had a tendency to form in lines. The corneal surface was smooth. The corneal sensibility was normal in the right eye but diminished in the left eye.

Case 9. W. K., aged 12 years, son of patient in Case 7, gave a history of occasional frontal headaches and irritation of the eyes. His general health was good; his height 5 feet 4 inches.

Vision, O.D. 20/20–2, O.S. 20/20–2. The central part of each cornea presented an area about 5 mm. in diameter, containing several typical large opacities and many smaller ones, but they were more marked in the left eye. With the slitlamp the opacities were found to be situated just beneath the surface. The deeper stroma was stippled but did not contain large opacities. The capillary loops of the limbic and corneal nerves appeared normal. Some of the more peripheral opacities tended toward a linear arrangement and several had a slightly clearer center. The corneal surface was smooth. The corneal sensibility was diminished in each eye but more in the left eye. The ocular fundi were normal.

In this family we find all the stages of typical Groenouw's degeneration from Case 5, in which the opacities could be seen only with the slitlamp, to Case 1, in which marked gross changes were present, even an irregularity of the corneal surface.

In all cases the lesions were bilateral, quite symmetrical and subcentric. The sensibility of the cornea was diminished in proportion to the degree of involvement in each case. In those showing

one eye more involved than the other, the sensibility was more reduced in the worse eye.

There is no consanguinity present in the family and no history nor findings of either tuberculosis or syphilis. The most striking finding in these cases is the height of all the direct descendants of the patient in Case 1. This strongly suggests a pituitary dysfunction. However, in the other branch of the family the individuals are of the short stocky type. Therefore it seems that the ocular process is not due to a dysfunction of any one gland of internal secretion.

While the disease is transmitted as a dominant characteristic[18, 19], it is not sex-linked although several pedigrees are reported in which all cases were encountered in females[9, 15]. In my group seven out of nine were females.

Certainly the pathogenesis of the nodular opacities of the cornea is still obscure. Most authors agree that it is a degenerative process but differ as to the primary cause.

Groenouw[3] believed it to be a sequel to a nutritive disturbance on a hereditary basis. This view was also held by Fuchs[20] who mentioned that disturbances of the internal secretions might be a factor. In one of his cases there was struma without symptoms. Wirth's[21] patient presented some exophthalmos, tremor, and hyperhidrosis. Stephenson in the discussion of Folker's[22] case, pointed out that some cases were believed to be connected with dystrophy of the thyroid gland.

Treacher Collins[23] felt that the condition had all the characteristics of an abiotrophy with primary dystrophy of the nerve fibers and their end organs. Pillat[14] supports this theory after studying a case in which there apparently was a mixed variety of nodular and reticular keratitis. He believes that both are due to degeneration of the trigeminal nerve. According to his theory, if the nerve fibers of the cornea were affected it would produce a reticular type, if the terminal plates were affected it would produce the nodular formation, and if both simultaneously, a mixed variety would occur. Kraupa[24] and Gutzeit[11] hold similar views but all admit that the etiology of the primary nervous affection is unknown.

On the other hand, Stanka[25] says that if the theory were correct, the corneal sensibility should always be totally abolished, while it is often only moderately reduced or even normal. He also claims to have demonstrated by vital staining, that there is never a direct contact between the nerve and degenerated foci. He also found a diminution in the number of the limbic capillaries and frequent aneurisms at their bifurcations and believed that faulty nutrition was the primary factor. Similar changes in the limbic capillaries are reported by Car[26], Sefic[27], and Ladekarl[28]. In my series the capillary loops at the limbus were normal in all cases.

Evidence of syphilitic infection in the reported cases is entirely lacking[29, 30].

No histological examination was made in my cases since the patients would not consent. However many authors Groenouw[2], Fuchs[20], Collins[23], Wehrli[31, 32, 33], Videky and Goldzieher[34], Zentmayer[35], Uthoff[12, 13], Miada[36], Uchida[37], Puscariu[38, 39], Löwenstein[40], Wirth[21], Goar[41], and Ladekarl[28] have reported on the examination of excised pieces of the cornea and Paderstein[42] had the opportunity of examining an entire globe in which the corneal degeneration was present.

Fuchs[20] has given perhaps the clearest presentation of the changes on the basis of staining with Giemsa's method. The staining shows very clearly the presence of an acidophile (red) and a basophile (blue) substance. The former is deposited on Bowman's membrane, either as a homogeneous mass or, at times, in layers and may send ramifications between the epithelial cells and bridge over breaks in the membrane. The basophile substance is most frequently found as granules and globules in the parenchyma. He believes that the separation of the basophilic, granular substance is the primary change and that the acidophilic is secondary, since it is not found in all cases. He also regards as secondary, the flattening of the epithelium above the nodules, the thinning and destruction of Bowman's membrane, and the separation, swelling,

or destruction of the anterior lamellae.

Many variations of Fuchs's findings are reported, which he suggests are due to differences in the age of the patient, in the phase of the development of the processes, and, perhaps, due to whether the tissue was from the central or peripheral parts of the cornea.

Videky and Goldzieher[34] did not find any deposits of foreign substances but did find superficial lamellae beginning to show hyaline degeneration.

Paderstein[42] described one case in which all the pathological changes were localized exclusively anterior to Bowman's membrane. The epithelium was greatly flattened and irregular in areas. He also found deposits of an amorphous substance resembling hyaline just anterior to Bowman's membrane. This substance caused the nodular formation. Hence Paderstein, in contradistinction to most other authors, considers the epithelial changes to be the primary ones.

Similar epithelial changes were found by Puscariu[38] and Wirth[21] and, in lesser degrees, by Elschnig[43] and Löwenstein[40]. Ladekarl[28] suggests that the most obvious view would be to consider changes of the epithelium, Bowman's membrane, and stroma, to be coordinate sequels to the same cause, involving now one and now another part.

As opposed to the thinning of the tissue covering the nodules, Uthoff[12] found a thickening of the epithelium to be a cause of the nodules. This grew in towards the stroma destroying Bowman's membrane.

Yoshida[44] found a marked thickening of Bowman's membrane and states there was newly formed connective tissue between this membrane and the degenerated parenchyma.

Salzmann[45] gives the pathological and anatomical findings in a form which he considers to be a variation of Groenouw's dystrophy. He found the superficial corneal layers cicatricially deformed in one case.

While nearly all authors accept the theory that the disease is a degenerative process, Wehrli[31, 32, 33] advocates the view that it is a chronic tuberculous inflammation, having much the same character as a lupus of the skin. He bases his view upon the clinical grounds of tuberculosis elsewhere, general and local reaction to tuberculin, and upon finding in one single preparation a few segmented, acid-fast bacilli which he considered tubercle bacilli. He also describes tissue changes resembling tubercular nodules and says deposits of a foreign substance were entirely absent. The heredity he calls pseudo-heredity, and considers it similar to the familial appearance of tuberculosis.

After a careful review of all histological reports, E. von Hippel[18] states that on the ground of anatomical findings it appears to him that a diagnosis of tuberculosis is "hazardous and not sufficiently substantiated. His (Wehrli's) other arguments are, however, noteworthy. The anatomical findings appear not unessentially to differ from those of other authors. It is to be regretted that a statement about the retention of Giemsa's staining is missing. The same would have facilitated a comparison with the cases of Fuchs. For the present, one has a choice whether one will accept that various stages of the same process are considered or whether under the picture of nodular degeneration of the cornea, etiologically and anatomically quite different processes are concealed".

The treatment of this condition has been very unsatisfactory. Locally the instillations of a solution of dionin or the subconjunctival injection of a solution of dionin and mercury cyanide seem to be of benefit in some cases, as in Case 3. Zentmayer and Rush[29] thought that the administration of thyroid extract and potassium iodide helped to a moderate degree. In Green's case[46] tuberculin injections were beneficial. However, this is a rare exception.

Excision of the superficial layers of the cornea is advocated (Groenouw, Ladekarl) but the visual results would not seem to justify it. In the advanced stages, Groenouw[3] suggests an iridectomy for optical purposes.

So far as can be learned a spontaneous cure for the disease has never been seen.

It is hoped that further study of the endocrine glands may reveal the underlying etiological factor.

## Summary

1. Nine cases of nodular degeneration of the cornea in three generations are reported with descriptions of the appearance with slitlamp microscopy.

2. The direct descendants of the patient in Case 1 are all very slender and tall, suggesting a pituitary dysfunction.

3. Age of onset varies even in the same sex: Case 2, middle age; Case 9, adolescence.

4. The nodular and latticelike degenerations are both present in this series. These should be considered different manifestations of the same process.

5. The earliest stage can be detected only by slitlamp microscopy (Case 5).

6. Theories of pathogenesis are presented and reports of pathological findings are summarized.

7. Treatment is still unsatisfactory.

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# PRACTICAL CYCLODAMIA

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The writer hopes that this further paper on the subject will answer the many questions that have been asked him concerning it. He is careful to state the limitations of this method and to make clear that it does not replace tests made under thorough cycloplegia. Presented at the Rochester Summer School of Ophthalmology, August 5, 1932.

Reliable knowledge of the total refractive error is useful in every case in which glasses are to be prescribed. It is often needed for the intelligent understanding of symptoms, for the certainty that the immediate correction ordered will be adequate, and for the general management of the case with all that this implies. When a prescription for glasses is determined by noncycloplegic methods without reference to the unknown total error, the prescription may often be much the same as if determined as a proper undercorrection of the known total error, but it is by no means so apt to be free from mistakes or to be so generally satisfactory.

Knowledge of the total error is not afforded by ordinary noncycloplegic refraction, but this does not mean that it can be afforded by cycloplegia only, or always by cycloplegia, or ever by incomplete cycloplegia. There are three methods of obtaining such knowledge, none of which affords absolute precision and reliability although these vary considerably both with the method and with the expertness with which it is used.

1. The greatest precision and reliability are afforded by cycloplegic paralysis that has been proved to be complete by the recession of the near-point to infinity under the full correction indicated and by the abolition of all range of accommodation under added convex spheres. Any cycloplegic drug may be used provided that it obtains such complete paralysis: but unless the completeness of the paralysis is actually proved in each case, all reliability is wanting, since the error revealed may be anything between the total and the manifest errors. Ordinary homatropin cycloplegia, for example, often fails to obtain complete paralysis, and when this occurs it is not only unreliable but actually misleading.

2. Whenever complete cycloplegic paralysis is contraindicated, or unobtainable, or unproved, or unattempted, the next most reliable method is good cyclodamia which, while somewhat less precise, affords in most cases a sufficiently close approximation to the total refractive error for all practical purposes.

3. Good bilateral fogging also often approximates the total error but quite unreliably, although it is very useful in other ways.

Since reliable knowledge of the total error is usually needed and is best afforded by cyclodamia when thorough cycloplegia is not obtained, the ability to use cyclodamia well is of real importance; and it is to that end that this study of practical cyclodamia has been undertaken.

Cyclodamia is an "all-blurred vision" method of refraction, quite different from all fogging methods. It was devised primarily for obtaining a quick approximate measurement of the total refractive error whenever the latter is not more reliably measured under thorough cycloplegia. This approximation then serves much the same purpose as does static refraction in guiding and in checking ordinary noncycloplegic methods, such as bilateral fogging and manifest refraction, which, however, are also needed for the determination of the finer details of the correction to be ordered but which afford much less reliable information about the total spherical error.

**Essential differences between fogging and cyclodamia.** Fogging, as generally understood, comprises all those countless variations from manifest refraction which use overcorrection of the spherical error and the blurred vision thereby entailed, to induce ciliary relaxation, but which gradually remove the overcorrection to measure the refractive er-

ror finally, by the strongest lenses which then permit sharp vision. All fogging is based upon the assumption that most of the ciliary relaxation induced by the overcorrection will be maintained by the strongest lenses that allow sharp vision long enough after the overcorrection is removed for the error which the relaxation reveals to be measured by such lenses. This assumption, although justified practically in many cases, is a serious source of inaccuracy in others. For the same reason that the blurred vision of overcorrection usually induces accommodative relaxation, the sharp vision used in measurement of the refractive error when the overcorrection is finally removed usually has the opposite effect and actually stimulates accommodative activity: sometimes slowly and gradually, more often instantly when sharp vision and accommodative activity have become closely associated by habit and necessity. The stimulus is so slight as to be practically negligible in a great many cases, but is sometimes very considerable in others: and its effect in lessening the accommodative relaxation already induced by the overcorrection, whether by much or by little, is of course unrecognized and unsuspected in all methods of fogging because they use sharp vision in measurement.

This variable stimulus of sharp vision explains much of the unreliability of bilateral fogging, which, especially when used after bilateral skiascopy with distant fixation, is probably the best of all the fogging methods. Good bilateral fogging quite often reveals most of the total spherical error, or more of it than should be immediately corrected, but, as is well known, it is far from being reliable for this purpose because in many cases it fails to reveal more than a small part of that error. The cause of this failure is usually assumed to be an accommodative anomaly which will yield only to cycloplegia. In the opinion of the writer such anomalies are not very common, and the actual cause is much more often the instant stimulus of sharp vision to habit accommodation, which is entirely unappreciated unless it is suggested by skiascopy or revealed by blurred-vision tests. Such tests show beyond question that when bilateral fogging, after using continuous overcorrection to induce and usually obtain considerable ciliary relaxation, finally takes off all overcorrection, to measure the error by the strongest lenses allowing sharp vision usually entails a loss of some of the relaxation already obtained and not infrequently of a large part of it. If this loss is to be avoided, continuous bilateral overcorrection and blurred vision must be used not only to induce ciliary relaxation, but also to measure subjectively the refractive error thereby revealed, as bilateral skiascopy with distant fixation measures it objectively.

Cyclodamia is the only method that does this. Starting out with procedures not unlike those of bilateral fogging though much more precise and thorough, it goes far beyond all fogging in its attempt to carry the use of overcorrection to the limit of its effectiveness in every way, including its use in measurement. The basic ideas of cyclodamia are: 1. To make continuous bilateral overcorrection of the spherical error of about +1.50 D., after quite accurate keratometric and skiascopic correction of any cylindrical error, together with a real attempt by the patient to name the letters on the chart somehow, as far down as the blur will permit any sort of recognition, and induce as nearly complete ciliary relaxation as possible. 2. To measure the error thereby revealed, while it is still overcorrected, by the lenses which blur the patient's vision to just 20/200 (less +1.50 D. sph., which normally blurs emmetropic vision to just 20/200), and to check this measurement by a similar one at 20/40 (less +0.50 D. sph.). 3. To measure the error at the moment of the maximum relaxation obtained, whenever the amount of relaxation is at all variable, by accepting as valid the greatest amount of spherical error revealed at any time during the overcorrection either by skiascopy or by blurred vision. In brief, cyclodamia tries to get the closest approximation to the total error that it is possible to get without cycloplegia by a superfogging use of overcorrection fol-

lowed by bilateral blurred-vision measurement of the maximum refractive error revealed.

Cyclodamia thus differs from bilateral fogging in the intensity and precision of its use of overcorrection, in its "all blurred vision" measurements, and in its ability to utilize for measurement the maximum ciliary relaxation obtained. Its approximation to the total spherical error is consequently much more often accurate than is that of bilateral fogging or than that of any sharp-vision method of refraction without the aid of complete cycloplegic paralysis. Its approximation must always, of course, be less than the static error by the allowance for the normal tonicity of the unparalyzed ciliary muscle, which averages +0.50 to +0.75 D., except in high degrees of error.

**Expert and ordinary use of cyclodamia.** Complete ciliary relaxation at the moment of measurement is the end toward which all the efforts of cyclodamia are directed. How often this end will be actually attained or closely approximated in practice will, in the long run, depend more upon the experience and skill of the examiner in his use of the method than upon the patients: although there are exceptional cases in which expert use fails, and frequent cases in which ordinary use succeeds. The latter are cases in which good relaxation is easily obtained and its amount is the same in all the tests. When relaxation is obtained with difficulty, however, and in small or variable amount, alertness, clear-thinking and real noncycloplegic skill are needed for reliability, and in such cases thorough cycloplegia is often the easiest and best procedure and sometimes the only sure one.

Cyclodamia is usually more reliable than homatropin cycloplegia as ordinarily used and reveals a larger error, unless the cycloplegic paralysis is very nearly complete. With expert use it is but little less reliable than the best homatropin cycloplegia, although it shares the unreliability of the latter in those occasional cases which yield only to prolonged atropinization. Real expertness, however, will seldom be acquired without considerable study and routine use of the method, comparing the amount of error which it reveals with that revealed by subsequent thorough cycloplegia whenever possible as well as with that revealed by good bilateral fogging, and considering thoughtfully the reasons for any differences found. Only in such a way is any examiner likely to learn how far and in what types of cases his own use of cyclodamia may be wholly depended upon, and what kinds of accommodative behavior under cyclodamic restraint indicate the need for thorough cycloplegia. Until such expertness in using it and in recognizing its limitations has thus been surely acquired, cyclodamia should not be used to replace possible thorough cycloplegia to any degree whatever. Such expertness is only needed, however, when competing for accuracy with thorough cycloplegia or when the greatest possible noncycloplegic accuracy is desired.

Skillful use of cyclodamia should come easily to those who use bilateral fogging well and use good cycloplegia frequently as a check. It is not so easy for those who make no use of bilateral fogging but rely wholly upon routine cycloplegia and manifest refraction, or upon the latter alone when cycloplegia is contraindicated, until they learn to look at variable accommodative activity from the cyclodamic point of view. This regards accommodation as having a limit of relaxability, which is usually close to total relaxation and which can usually be reached, but which can only be reached by unremitting and watchful effort in the use of bilateral overcorrection. Without this point of view cyclodamia is unintelligible. When used discerningly, however, even though not very skillfully at first, cyclodamia reveals more of the total spherical error or reveals it in more cases than does any other noncycloplegic method of refraction. It is able therefore to increase to some extent the accuracy of necessarily noncycloplegic refraction in many cases. It should also be used in other cases where it can be checked by cycloplegia, for without such occasional check it is quite likely to be more

carelessly used than sharp-vision methods, and therefore, to be little if any more reliable.

**The various uses of cyclodamia.** Both cyclodamia and cycloplegia seek to reveal the total refractive error: cyclodamia quickly and approximately, cycloplegia slowly and more exactly. While they do not cover quite the same field, each affording some information which the other does not, they are interchangeable to some extent, although only when cyclodamia is very well used and cycloplegia is proved to be complete. Since ordinary cyclodamia is somewhat less reliable for determining the total error in certain cases than is thorough cycloplegia, its chief field of usefulness is not in replacing such cycloplegia, but in obtaining some reliable knowledge of the total error when cycloplegia is omitted or its completeness is unproved, both for general information and for checking the adequacy of the spherical correction to be ordered. Cyclodamia is especially useful in cases of early, doubtful, or established glaucoma; in patients between the ages of thirty-five and sixty years, where many of the more serious mistakes of unsuspected noncycloplegic undercorrection occur; in clinic cases for its time-saving short cuts; in insurance and compensation cases as a check upon malingering; in the frequent re-examination necessary in progressive myopia; in corneal nebulae with lowered visual acuity; and in old people whose partial cataracts, second sight, and slowly acting remnants of accommodation are often confusing.

Cyclodamia may also be used as an additional method (1) to aid in checking the completeness of the cycloplegic paralysis, which is obviously incomplete when it reveals less error than does cyclodamia; or (2) to obtain more detailed information about accommodative behavior and habit by comparison of the error which it reveals with that revealed by thorough cycloplegia, by bilateral fogging, and by manifest refraction—information that is often useful in the study of accommodative anomalies; or (3) simply to save time. Cyclodamia is a very rapid method when well used and may be less accurate unless rapid: it affords so much quick information about all phases of the refractive error that its preliminary use as an orientation method may well shorten the whole time of any examination. Cyclodamia is also essentially a simple method, though it requires a precise stage setting and a routine which must be so thoroughly learned as to become habitual. Once this is learned, however, all the information that cyclodamia affords can usually be obtained within five minutes.

**Cyclodamia a method for general accuracy, not accuracy of detail.** When the accommodation is completely paralyzed by thorough cycloplegia, the amount and axis of the total cylindrical error may be worked out in detail, at leisure, for full correction later if desired, without interfering with accurate measurement of the total spherical error which is measured without thought of what part of it is to be corrected. Noncycloplegic methods that make any serious attempt to reveal the total spherical error must also measure it without thought of what part of it is to be corrected, and must measure it quickly at the moment of greatest accommodative relaxation. Such methods must also ignore the finer details of the astigmatic error, for all noncycloplegic methods which reveal those details require too great intentness upon them on the part of the examiner to permit enough attention to be given to the effect of accommodation and sharp vision upon the total spherical error so that it can be revealed with any sort of reliability. Cyclodamia, therefore, after as accurate a preliminary correction of the astigmatic error has been obtained as can be made by wholly objective methods, deliberately ignores or subordinates all refractive details that do not aid it in its main purpose in order to concentrate upon securing maximum ciliary relaxation and maintaining it during measurement, so as to add to its already fairly close approximation of the total cylindrical error the closest possible approximation to the total spherical error. With this as a background for general accuracy, the finer

details of the astigmatic error needed for the prescription of proper glasses and the amount of spherical error to be immediately corrected must then be determined by other methods.

**The prescription of glasses after cyclodamia.** It must be repeated that no single method of refraction affords sufficient information for the satisfactory prescription of glasses. Even complete cycloplegia, which reveals both the spherical and cylindrical errors as accurately as they can be brought out, reveals them only under the abnormal conditions of ciliary-muscle paralysis and therefore does not of itself indicate proper correction. Additional information as to the spherical and cylindrical errors correctible under normal accommodative conditions, usually best afforded by bilateral fogging and by manifest refraction, is also needed if the glasses to be prescribed are to be comfortable, although enough of the total error must always be corrected to make the glasses effective. The same additional information is likewise needed after cyclodamia, which obtains its usually close approximation to the total spherical and cylindrical errors under the abnormal accommodative relaxation of overcorrection and blurred vision.

For several reasons the postcyclodamic examination for the prescription of glasses should follow the 20/40 cyclodamic measurement at once, and should begin with the bilateral-fogging measurement of the error by the strongest lenses which then permit sharp vision. Under such conditions bilateral fogging is at its best and this measurement takes but a moment. It is chiefly useful for determining the maximum amount of spherical error that can ordinarily be corrected immediately, and, in the opinion of the writer, should always be used for this purpose in every examination for the prescription of glasses. Although the immediate spherical correction to be ordered can very rarely exceed the full bilateral fogging error and must often be temporarily somewhat less, it must be close enough to relieve all symptoms but not so close as to cause prolonged discomfort. In determining its exact amount, age, health, temperament, and conditions of close eye work have to be considered, as well as the difference between the total spherical error to be eventually corrected in full, and the present bilateral fogging error. The larger this difference, the closer to the full bilateral fogging error should the immediate correction be and the sooner should the patient return for additional spherical correction. Knowledge of the total error is often needed for this purpose. It is a serious mistake to think that because the spherical error revealed by good bilateral fogging is usually the limit of immediate spherical correction, knowledge of the total spherical error is therefore unnecessary and superfluous.

The postcyclodamic examination should also include manifest refraction for determining the final exact amount and axis of the cylindrical correction either by time-saving cross cylinders or in other ways, for record of visual acuity with and without correction, and for determining the preference of the patient as to the amount of spherical correction desired. The latter should not be taken too seriously unless widely different from the bilateral fogging error, or unless the patient is of the nervously irritable and unstable type in whom spherical correction can be increased only a little at a time regardless of the amount of the total spherical error.

**The essential procedures of cyclodamic refraction.** These have been described in detail elsewhere*, and will only be quoted here in outline, with the addition of such comment as has been suggested by questions.

"Reliable measurement of the corneal astigmatism with a good keratometer**, placing the correction thereby in-

* "Cyclodamia", Amer. Jour. Ophth., Dec., 1926; "Routine Keratometry", Amer. Jour. Ophth., Sept., 1927; "Estimation of Total Refractive Error without a Cycloplegic", Trans. Amer. Acad. Ophth. Otolaryn., 1930, and (less fully) Amer. Jour. Ophth., July, 1931.

** The writer uses a Meyrowitz keratometer, 1920 model, having as yet been unable to get as quick and as reliable routine measurements with other instruments.

dicated for each eye in the trial frame." This step cannot well be omitted without either loss of time or of accuracy somewhere. It is of course perfectly possible to determine the total astigmatism by skiascopy without reference to the corneal astigmatism, but it will seldom be done quite so accurately and so quickly, and therefore with so little distraction from the main problem of securing maximum accommodative relaxation with which prolonged skiascopy sometimes interferes.

"Alternating skiascopy of both eyes with distant fixation under the corneal astigmatic correction together with ample spherical overcorrection in the trial frame, first to approximate the overcorrection to the working distance, second to change the cylinders slightly to correct the total astigmatism in the few cases where this is indicated, third to promote ciliary relaxation and watch for its maximum amount under added spheres, fourth to record the maximum error which such skiascopy reveals at any time." Steady distant fixation and continuous overcorrection of both eyes even while changing lenses must be maintained without a break, and the room must not be too dark to prevent rough recognition of the object of fixation. The use of a mydriatic that is not a cycloplegic, such as cocain or adrenalin, is sometimes necessary but should be avoided if possible, since skiascopy is apt to be less accurate with a fully dilated pupil.

"Starting with the skiascopic correction of the total astigmatism and bilateral spherical overcorrection of about +1.50 D., the next procedure is the determination of the lenses with which the patient can just recognize and name correctly the 20/200 letter and perhaps one but not both of the 20/100 letters at 20 to 22 feet distance, first with both eyes together, then, if not recognized by both eyes, with each eye alone while the other is just surely excluded from recognition by a 0.50 to 1 D. greater overcorrection. These lenses, less +1.50 D. sph., are recorded as the 20/200 error. This should then be checked by a similar determination of the 20/40 error, less +0.50 D. sph. The chart must be well lighted and both eyes kept wide open and overcorrected at all times." Since accommodative relaxation is less often variable between the 20/200 and the 20/40 levels of blurred vision than at the level of sharp vision, precision in these blurred-vision measurements is usually more easily and quickly attained than in the sharp-vision measurement of bilateral fogging. But it must be remembered that whenever relaxation at any level is at all variable, the record must be that of the strongest lenses which at any time permit the vision proper to that level. Precision is also easier in blurred-vision measurement because of the two-way possibility of better or worse vision than in sharpest-vision measurement with its one-way possibility of worse vision only. Bilateral fogging also uses this fact when it works at the 20/20 instead of the 20/15 level of sharp vision. Whenever blurred vision seriously annoys the sophisticated patient for the moment, or when its use is misunderstood from lack of confidence in the examiner, firmness, patience, and some explanation are often necessary and will usually bring about cooperation. Cases in which blurred vision actually stimulates accommodative activity beyond the first moment or two of disorientation and confusion, despite good handling, are extremely rare.

"Three roughly accurate approximations to the total refractive error have thus been made and recorded; viz., the skiascopic error, the cyclodamic error at 20/200 and the cyclodamic error at 20/40. Whichever is the greatest of these errors, in the few cases in which all three do not practically agree, should be considered as the most reliable approximation to the total refractive error obtainable without cycloplegia*. The approximation is somewhat more reliable when they do agree, and when con-

* Unless of course a still greater error is revealed by bilateral fogging or other non-cycloplegic methods, which, with extremely rare exceptions, indicates that cyclodamia has been too hastily or too carelessly used.

siderable accommodative relaxation has been obtained." No questions upon this phase of cyclodamia have been submitted.

What part of the total error, revealed accurately by complete cycloplegia or approximately by cyclodamia, should be corrected immediately by glasses is then determined by the usual methods of noncycloplegic refraction: the spherical component largely by bilateral fogging, the cylindrical component by manifest refraction.

One case report is appended as an illustration of technic.

R.S., aged 42 years, physician, complains of headaches and blurred vision after much reading, occasional blurred vision for distance, and increasing lack of ability for mental concentration. He has good general health and physical condition. His refraction has been tested under homatropin upon several occasions, on the last of which +1 D. sph., was prescribed for each eye. He is now wearing this; removing the glasses occasionally for clearer distant vision.

**Examination.** Keratometer shows no corneal astigmatism.

Quick ophthalmoscopy shows clear media and normal fundi. About 1 D. hyperopia.

Bilateral skiascopy with distant fixation shows no cylindrical error, but a variable spherical error with a maximum of about +2.50 D.

Cyclodamic error = +2.75 D.I.E. 20/200 vision with both eyes is obtained under +4.25 D. but not under +4.50 D. Confirmed by 20/40 vision with both eyes under +3.25 D. but not under +3.50 D.

Bilateral fogging error at 20/15 = { +0.75 D. steadily; +1.25 D. intermittently
at 20/20 = +1.50 D. intermittently
at 20/30 = +2. D. intermittently

Manifest error. With either eye alone accepts no correction. With both eyes together selects +0.50 D. sph. in preference to all other lenses. With cross cylinders selects no axis or correction.

Static error not determined. Estimated at +3.50 D. sph.

Orthophoria.

Careful ophthalmoscopy shows nothing abnormal.

Tension normal to fingers.

Prescription: +1.50 D. sph., O.U., for constant wear regardless of slight temporary blur for distance. To be increased by small degrees to +2.75 D. sph. as soon as acceptable. Check examination in two weeks. Reexamination in 3 months.

**Incomplete use of cyclodamia. Two methods.**

*Cyclodamic relaxation with bilateral fogging measurement.* Many ophthalmologists have come to appreciate that bilateral fogging is often much more accurate when it includes preliminary keratometry and the relaxation methods of cyclodamia, especially bilateral skiascopy with distant fixation and continuity of moderate bilateral overcorrection. Such use forms a definite method which is distinctly better than "Combined skiascopy and fogging" though superficially somewhat like it, and which is probably the most reliable of all noncycloplegic methods using sharp vision for final measurement. While it very often reveals more error than ordinary bilateral fogging, and quite often more than "Combined skiascopy and bilateral fogging", it misses of course the fairly frequent cases in which a materially greater error could be revealed by the measurement methods of cyclodamia, as well as the rather rare accommodative anomalies which yield only to thorough atropine cycloplegia.

*Cyclodamic measurement only, as a check upon ordinary noncycloplegic refraction.* The grosser mistakes of noncycloplegic and incomplete cycloplegic refraction in regard to the total spherical error may often be detected by the following simple expedient, which takes but a moment. After the prescription for glasses has finally been written, these lenses are placed in a trial frame and plus spheres added until bilateral vision is reduced to about 20/200 in each eye while the other eye is excluded by a stronger plus sphere. Whatever more than +1.50 D. has to be added is the minimum amount by which the total spherical error has been undercorrected. The hint thus afforded will be much more fully appreciated if occasionally verified by subsequent measurement under complete cycloplegia.

A similar expedient is the addition of plus spheres to reduce bilateral vision to 20/40, which should require +0.50 D. Doctor Lancaster once told the writer that he invariably records the vision of both eyes under the addition of +0.50 spheres to the correction

which he is about to order, as a check upon the adequacy of the spherical correction. This is, in effect, a variation of the same expedient.

## Summary

1. Cyclodamia differs from bilateral fogging both in the precision of its use of overcorrection in inducing ciliary relaxation, and in its measurement of the refractive error thereby revealed, while still overcorrected and at the height of the relaxation by definite degrees of blurred vision, instead of by the strongest lenses which permit sharp vision. Thus no part of the relaxation obtained by the overcorrection is lost to the stimulus of sharp-vision measurement, as often occurs undetected in bilateral fogging.

2. Cyclodamia is chiefly useful for increasing the accuracy of all refraction, except that under cycloplegia which has been proved to be complete, by affording more reliable information as to the total spherical error and as to accommodative habit than can otherwise be obtained. This information is usually quite accurate, but is not sufficiently reliable to allow cyclodamia to replace possible thorough cycloplegia safely unless cyclodamia is very expertly used, and then with certain limitations. Cyclodamia is of course the more efficacious the better it is used, but even with quite ordinary use it affords a valuable check upon ordinary noncycloplegic refraction and upon haphazard homatropin cycloplegia. Any real understanding of what cyclodamia attempts to do, and how, should tend to make all noncycloplegic refraction somewhat more generally accurate.

3. Cyclodamia is also useful as an orientation method. Complicated as it may seem in theory, in practice it is both simple and rapid when its precise routine has once become habitual, and it usually affords so quick and roughly accurate an approximation to the whole refractive error that its use, preliminary to other noncycloplegic methods that are always necessary for the determination of the finer details of the correction to be ordered in glasses, should usually save time.

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# EXPERIMENTAL HYPERTENSION AND RETINAL ARTERIAL SPASM

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The injection of fecal extract and blood serum from patients with essential hypertension caused spasms of the retinal artery in rabbits. This effect was also noted in both rabbits and man after the injection of adrenalin. The author believes that if the cause of spasm can be found, the problem of essential hypertension will be solved. Read before the New York Academy of Medicine, Ophthalmological Section, May 16, 1932. From the ophthalmological service of Montefiore Hospital and Bellevue Hospital.

Most of the experimental work on hypertension in the past has been pursued with the aim of producing lipoid degeneration and atheroma. Clinical observation shows that atheroma may exist without hypertension and that hypertension may exist without atheroma.

Fishberg pointed out that atheroma and peripheral arteriosclerosis is frequently found in patients with myxoedema, and experimentally induced atheromatous and renal changes in animals. Thyroid extract administration resulted in improvement.

Newburgh and Clarkson report experimental work on rabbits in which atheroma, starting in the intima, was produced by a high protein diet. They denied the claim of Saltykow that cholesterin in the yolk of eggs and in milk caused atheroma in rabbits.

Hans Liebig produced arteriosclerotic lesions in the aorta of rabbits by administering cholesterin and linseed oil. Iodide prevented this effect.

Hering claims that the function of the depressor nerves is to inhibit adrenalin secretion.

C. Heymans and J. J. Bouckaert working on rabbits, showed that section of the depressor nerves at the aorta and at the carotid sinus resulted not only in tachycardia, but also in hypertension. The heartbeat rose to 200-250 and the blood pressure to 250 mm. Hg. Depressants and digitalis had no effect on these animals. The same result was produced by Herring and others.

Raab's animal experimentation brought out that lactic acid in a five percent solution caused a rise in blood pressure from 105 to 176. Carbon dioxide also caused an elevation of the blood pressure. Sensitivity to it was materially augmented by the presence of lactic acid. Inhalation of carbon dioxide increased the hypertension induced by lactic acid. This he claimed was produced by ischaemia of the medullary center.

Bell and Pedersen claimed that only a small percentage of advanced peripheral arteriosclerosis showed sclerotic changes in the arterioles; also that stimulation of the adrenals produced high blood pressure. This phenomenon is born out clinically. In Addison's disease, characterized by atrophy of the adrenals, the blood pressure is low. In neoplasm of the suprarenal gland, there occurs a paroxysmal elevation of the blood pressure.

Cushing's experiment of introducing a canula into the subdural space demonstrated that intracranial pressure and blood pressure could be made to rise together.

Bell and Pedersen give a résumé of the various factors to be considered in hypertension. They are as follows: Psychic—worry, fear, excitement. Nephrosis causes very little hypertension. Glomerular nephritis is almost invariably associated with hypertension. Both kidneys may be removed without producing hypertension. Urinary obstruction below the kidney will cause hypertension. Blocking of the renal vein (experimental) will also cause hypertension. They also claim that the original narrowing of the arterioles is spastic. Acute fulminating hypertension is probably of renal origin.

Santenoise, Verdier and Vidacovitch isolated a hormone (which they called *vagotonine*) from insulin by means of neutral salts and alcohol. This vago-

## Table 1

INJECTIONS WITH FECAL EXTRACT

| Date | Rabbit no. 950 | Rabbit no. 952 | Rabbit no. 953 | Date | Rabbit no. 938 | Rabbit no. 940 | |
|---|---|---|---|---|---|---|---|
| 11/25/30 | 1 c.c.— | ½ c.c.— | 2.5 c.c.— | 1/27/31 | 8 c.c.** | 12 c.c.** | ½ to 2 hours |
| 11/26/30 | 1 c.c.— | ½ c.c.— | 2.5 c.c.— | 1/28/31 | 8 c.c.** | 12 c.c.*** | after |
| 11/28/30 | 3 c.c.* | 2 c.c.* | 5 c.c.* | 1/29/31 | 8 c.c.** | 12 c.c.*** | injection |
| 12/3/30 | 3 c.c.* | 2 c.c.* | 5 c.c.* | 1/30/31 | 10 c.c.** | 14 c.c.*** | |
| 12/4/30 | 7.5 c.c.* | 5 c.c.** | 10 c.c.** | 1/31/31 | 10 c.c.** | 14 c.c.*** | |
| 12/5/30 | 7.5 c.c.* | 5 c.c.*** | 10 c.c.** | 2/1/31 | 10 c.c.** | 14 c.c.** | |
| 12/6/30 | 7.5 c.c.* | 5 c.c.*** | 10 c.c.* | 2/3/31 | 10 c.c.** | 16 c.c.** | |
| 12/7/30 | 7.5 c.c.* | 5 c.c.*** | 10 c.c.* | 2/5/31 | 10 c.c.** | 16 c.c.** | |
| 12/11/30 | 7.5 c.c.* | 5 c.c.*** | 10 c.c.* | 2/6/31 | 12 c.c.** | 16 c.c.** | |
| 12/13/30 | 7.5 c.c.* | 5 c.c.*** | 10 c.c.* | 2/7/31 | 12 c.c.** | 16 c.c.** | |
| 12/15/30 | 8 c.c.** | 6 c.c.*** | 12 c.c.* | | | | |
| 12/16/30 | 8 c.c.* | 6 c.c.*** | 12 c.c.* | | | | |
| 12/17/30 | 8 c.c.* | 6 c.c.*** | 12 c.c.*— | | | | |
| 12/19/30 | 8 c.c.*— | 6 c.c.*** | 12 c.c.*— | | | | |
| 12/20/30 | | 6 c.c.*** | | | | | |
| 12/21/30 | | 7 c.c.*** | | | | | |
| 12/22/30 | | 7 c.c.*** | | | | | |
| 12/24/30 | | 7 c.c.*** | | | | | |
| 12/26/30 | | 7 c.c.*** | | | | | |
| 12/27/30 | | | | | | | |

Feces extract was made by allowing feces to stand in an equal amount of normal saline from 12 to 24 hours, then filtering through Berkefeld filter, filtrate being sterile. All injections were intraperitoneal. Asterisks in this and succeeding tables indicate degree of intensity of reaction following injection of amount specified. Dash indicates no reaction. Spasms manifested themselves as irregular paling and alternating changes in color and caliber of retinal arteries. Smaller branches seemed to disappear entirely.

Rabbit No. 952 showed the most marked spasm; No. 950 reacted next best; and No. 953 practically not at all. No. 938 showed moderate spasm; No. 940 marked spasm. Rabbits No. 950 and 953 began to show so little that they were discarded on Dec. 20, probably having become immune to toxin. Rabbit No. 952 *Autopsy findings*—autolysis—some peritonitis, which probably caused death. Eyes removed for microscopic study. No arteriosclerosis was found.

## Table 2

INJECTIONS WITH BLOOD SERUM OF PATIENTS WITH HYPERTENSION

| Date | Rabbit no. 943 | Rabbit no. 949 | | Date | Rabbit no. 944 | Rabbit no. 946 | reaction |
|---|---|---|---|---|---|---|---|
| 3/3/31 | 3 c.c.*** | 3 c.c.* | ½ to 2 hrs. | 3/24/31* | 1 c.c.— | 3 c.c.** | 20 to 30 min- |
| 3/4/31 | 3 c.c.*** | 3 c.c.** | after | 3/25/31 | 3 c.c.— | 3 c.c.*** | utes after |
| 3/5/31 | 3 c.c.*** | 3 c.c.* | injection | 3/26/31 | 5 c.c.*— | 5 c.c.*** | injection |
| 3/6/31 | 4 c.c.*** | 4 c.c.* | | 3/27/31 | 5 c.c.— | 5 c.c.*** | |
| 3/7/31 | 4 c.c.*** | 4 c.c.* | | | | | |
| 3/8/31 | 4 c.c.*** | 4 c.c.* | | | | | |
| 3/9/31 | 4 c.c.** | 4 c.c.*— | | | | | |
| 3/10/31 | 4 c.c.** | 4 c.c.— | | | | | |

INJECTIONS WITH ADRENALIN

| | Rabbit no. 944 | Rabbit no. 946 |
|---|---|---|
| 3/28/31 | 6 c.c. | 6 c.c. |
| 3 minutes | | marked spasm |
| 5 " | | " " |
| 10 " | | spasm decreasing |
| 15 " | no spasm | |
| 30 " | slight if any | slight spasm |

November 7th two rabbits were injected with ½ c.c. adrenalin (1-20,000). One showed marked spasm 3 minutes after injection. The other showed no spasms.*

* Since writing this paper, I have injected four rabbits with adrenalin and have obtained arterial spasms in three. This brings the total number of rabbits injected to six, with positive results in four.

tonine has a stimulating effect on the vagus, or oculo-cardiac reflex, causing hypotension. They claim that insulin contains two hormones, one inducing hypoglycaemic action, the other having a hypotensive effect. They found that some samples of insulins do not contain vagotonine which would modify the action on the vagus. With others they concluded that the depressing effect on the vagus caused secretion of adrenalin.

Frey also found that the pancreas contained a circulatory hormone, which produced dilatation of small blood vessels causing hypotension. Intramuscular injection of this hormone produced a lasting effect in cases of hypertension. This substance forms some combination in the blood, which is inactive. Passing through the kidney and other organs this compound splits up again, freeing the hormone, which can be identified in the urine.

In the study of the etiology of arteriosclerosis many factors must be considered. In order to reach any definite conclusion we should get rid of the term "generalized arteriosclerosis," and make an attempt to classify this disease from the etiological standpoint.

Myocardial and renal disease, as well as senile arteriolar disease may produce hypertension. However the great group of hypertension cases should be classified as a primary disease, caused by arteriolar spasms followed by secondary changes in the spastic arterioles. This group falls under the head of essential hypertension and arteriolar dis-

**Table 3**

INJECTION OF PATIENTS WITH ADRENALIN

| | | | |
|---|---|---|---|
| A. G. 25 yrs. Phys. condition—normal | | | |
| | B.P. before injection | | 125/30 |
| | 1 c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 135/70 spasm not appreciable |
| | 10 m. " " | B.P. | 160/85 retinal arteries show spasm |
| | 15 m. " " | B.P. | 180/90 retinal spasm marked |
| | 20 m. " " | B.P. | 150/80 no spasm |
| J. D. 38 yrs. | | B.P. | 130/80 |
| | 1 c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 150/85 no spasm |
| | 10 m. " " | B.P. | 160/85 spasm slight |
| | 15 m. " " | B.P. | 160/85 spasm but not marked |
| A. C. 26 yrs. | | B.P. | 120/60 |
| | 1½ c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 135/70 no spasm |
| | 10 m. " " | BP. | 170/80 vessels around disc show spasm |
| | 15 m. " " | B.P. | 185/85 marked spasm |
| O. H. 26 yrs. | | B.P. | 125/60 |
| | 1½ c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 130/65 |
| | 10 m. " " | B.P. | 135/65 slight spasm |
| | 15 m. " " | B.P. | 140/70 |
| E. M. 26 yrs. | | B.P. | 125/60 |
| | 1½ c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 130/65 slight spasm |
| | 10 m. " " | B.P. | 145/70 slight spasm |
| A. M. 46 yrs. | | B.P. | 130/70 |
| | 1½ c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 160/75 slight spasm |
| | 10 m. " " | B.P. | 180/80 definite spasm |
| E. S. 37 yrs. | | B.P. | 135/60 |
| | 1½ c.c. adrenalin (1-1000) injected hypodermically | | |
| | 5 m. after injection | B.P. | 170/80 spasm |
| | 10 m. " " | B.P. | 190/85 marked spasm |
| | 15 m. " " | B.P. | 170/70 slight spasm |
| | 20 m. " " | B.P. | 150/60 no spasm |

ease. The work which has been done up to the present seems to point to the following hypotheses:

1. Spasms of the visceral and cerebral arterioles cause hypertension.
2. Spasms are caused by increased secretion of adrenalin.
3. Stimulation of the depressor nerve of the vagus causes a diminished adrenalin secretion and hypotension.
4. A paralyzing effect on the depressor causes increased secretion of adrenalin and hypertension.
5. This paralyzing effect on the depressor nerve may be caused by a disturbance of the normal function of the thyroid, pancreatic, and pituitary glands.
6. Some change in the blood chemistry or the presence of certain toxins may cause the underlying endocrine disturbance producing hypertension.
7. "Vagotonine", a hormone extracted from insulin, has a hypotensive action.

While subjective symptoms may suggest the occurrence of arteriolar spasm in the brain or elsewhere, objective signs are available only when the spasm occurs in the retinal artery.

It seems self-evident that if the cause of spasms is found, the problem of essential hypertension and arteriolar disease will be solved.

Starting with this premise, I thought it would further the progress of this study, if spasms could be produced experimentally and observed in the fundi.

Normal rabbits were given intraperitoneal injection of the fecal extract from patients without hypertension. This was followed by the injection of blood serum from patients without hypertension. We then used fecal extract and blood serum taken from patients with essential hypertension in the active stage.

Finally adrenalin was injected into rabbits and normal human subjects.

Spasms in the retinal arteries were induced in rabbits by the injection of fecal extract and of blood serum from patients with active hypertension, and in both rabbits and man also by the injection of adrenalin. The controls were negative.

I wish to express my thanks to Dr. M. Abeles of Montefiore Hospital for his able assistance in the experimental work on rabbits; also to Drs. David Marine and E. J. Bauman of the pathological laboratories of Montefiore Hospital for their helpful cooperation.

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# SIDEROSIS BULBI

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On the basis of his findings in fifteen cases of siderosis bulbi and of those reported in the literature, the author takes up the question of the time interval that must elapse between the injury and the appearance of siderotic manifestations. He concludes that the behavior of foreign bodies with regard to siderosis, as well as in other respects, is incalculable, and that no categorical statement as to the minimum time requisite for its appearance is justifiable.

Cases of overlooked foreign bodies in the eye are, in the very nature of things, likely to find their way into the literature mainly at second hand. Mills and Jeançon[1] recently reported twenty-one cases of overlooked magnetic foreign bodies, the majority of them, however, being of less than three weeks' retention. Cases of siderosis are more rare, and, for the same human reason, are hardly more likely to be reported. Black[2] quotes Clegg to the effect that "only thirteen cases were observed among 111,371 eye injuries in the outpatient department of the Royal Eye Hospital, Manchester, in fifteen years", but believes that this is short of the actual total, for others have been diagnosed after they have been admitted into the hospital. Mills and Jeançon report six cases of siderosis lentis among their cases. Senâ[3] in an analysis of sixty-two cases of intraocular and orbital foreign bodies, about one half of which were iron, notes four instances of siderosis.

Considering the rarity of siderosis bulbi and of its report in the literature, the frequent lack of adequate details, and the existence of conflicting opinions as to the evolution and clinical manifestations of siderosis, often based on limited personal experience, it seems justifiable to record an observation of fifteen cases. All of them were seen in the past two years in the course of making over five thousand eye examinations at the New York State Department of Labor, Bureau of Workmen's Compensation. The appended table contains a condensed summary of the history of these cases. The series includes all cases of siderosis that have been observed, those pending as well as those closed, regardless of the legal disposition made. Disallowance may be the result of legal technicalities and adverse medical opinion as to causal relation. The study, therefore, represents the writer's medical observations rather than the New York State Department of Labor's final decision.

## Discussion

The chief source of controversy in compensation cases is the length of time required for an intraocular iron particle to produce siderotic manifestations in iris and lens. One encounters occasional statements in the literature and by expert witnesses that it requires about six months[1]. A survey of the literature shows a certain unanimity of opinion in regard to this question. Fuchs[4] says: "The condition (siderosis) may develop as early as two months after the injury (Natanson) but usually not till much later." Wagenmann[5], who calls attention to the distinction that should be made between direct siderosis, that is, in the immediate neighborhood of the foreign body, and indirect siderosis, that is, at a distance from the foreign body, finds that direct siderosis begins shortly after its entry, and that indirect siderosis requires time; that in the iris direct siderosis is immediate, while in the lens, quoting Sattler, it may appear as early as after three weeks; that indirect siderosis in the iris, quoting Vossius, has been noted as early as after twenty days, and in the lens takes months to years. Jess[6] reports seeing fine reddish-brown subcapsular dots uniformly distributed (considered by him characteristic of extra-lenticular iron) after an interval of eight weeks. Balcarek[7] reports a case of siderosis lentis due to a particle in the lens within eight days. In Mills and Jeançon's

DATA ON FIFTEEN CASES OF

| Occupation | Age | Eye | Date | Accident | Previous Findings; Diagnosis and Treatment |
|---|---|---|---|---|---|
| 1. Auto Mechanic | 55 | O.D. | 2/18/29 | Struck in right eye while removing splash pan from car. | Corneal abrasion. Disabled 7 days. 11 months later: corneal scar, opacities of lens and vitreous. 15 months later, x-rays negative; diagnosis: "degenerative condition." |
| 2. Laborer | 47 | O.D. | 10/10/31 | Piece of hammer chipped off and struck eye. | Conjunctival hemorrhage and chemosis upper lid. 23 days later: posterior synechiae; iris pigment on lens capsule; V=20/200. "Iritis of constitutional origin." |
| 3. Machinist | 35 | O.D. | 10/20/31 | Hot metal from lathe struck eye. | Two pieces of metal removed from cornea. |
| 4. Concrete Laborer | 36 | O.D. | 10/19/25 | Stone hit O.D. while using hammer and chisel. | Retinal detachment; pupil widely dilated. Not x-rayed. Later no pathological findings. Diagnosis of artificial atropinization and simulation after year's observation. 4½ years later, another ill-defined accident. 2 days later, siderosis found. X-rays negative. |
| 5. Marble Cutter | 49 | O.D. | 2/6/30 | While cutting marble something lodged in eye. | F.b. in cornea—deep whitish speck. 45 days later: large yellow central mass in lens and dustlike, subcapsular opacities. X-rays negative. Siderosis. |
| 6. Night porter | 40 | O.D. | 8/31/31 | Felt something strike right eye while handling hangers. | Intense congestion, exudate in anterior chamber, lens covered with pigment, posterior cortical cataract. 3 months later x-ray shows f.b. |
| 7. Stonecutter | 22 | O.D. | 9/14/31 | Knocking edge off concrete, struck in O.D. | F.b. deeply imbedded in cornea. 9 days later siderosis recognized but believed old. F.b. extracted four months later. |
| 8. Mechanic | 33 | O.S. | 2/9/31 | Drawing a gear on a bus's crank shaft, something flew into eye. | No report. F.b. removed five months later. |
| 9. Car body inspector | 24 | O.S. | 11/6/30 | Something struck eye while on floor, where 10 people were working. | Given first aid and discharged as recovered. 7 weeks later: discolored iris, deposits on anterior capsule, foreign body in anterior lens. Extraction and later cataract removal. |
| 10. Laborer | 26 | O.S. | 5/5/31 | While carrying steel, something flew into eye. | Conjunctivitis O.S. 18 days later: iris discolored, pupil dilated and fixed; f.b. diagnosed and removed. V=20/20 on discharge. |
| 11. Summer resort worker | 31 | O.D. | 3/4/31 | Piece of steel O.D. | Nasal subconjunctival hemorrhage, pupil dilated. F. b. removed 6 months later. |
| 12. 31516516 ? | 26 | O.S. | 4/1/32 | Something struck eye while working. | Corneal "abrasion." No x-ray. One month later larger pupil noted by claimant. 5 months later greenish iris, powdery fine "subepithelial" lens deposits, macular edema were noted, x-ray positive and f.b. removed, and vision 20/70. |
| 13. Foreman | 60 | O.S. | 12/7/31 | While coopering, chip from barrel hook struck eye. | Corneo-scleral perforation and vitreous hemorrhage. F. b. diagnosed 5 days later but attempts at removal not successful. |
| 14. Woodworker | 30 | O.S. | 3/28/29 | While driving key into gear with hammer, something entered eye. | Penetration of sclera and scleral hemorrhage. Attempts at removal of f. b. not successful. |
| 15. Metal polisher | 34 | O.S. | 2/5/30 | Emery got into eye while grinding. | F. b. in deeper layers of cornea. Attempts at removal not successful. |

series, the six cases of indirect siderosis lentis were observed ten to fourteen months after entry; and discoloration of the iris, in one case, as early as twenty-one days after entry. According to Mayou[8], it takes at least six to twelve weeks for the staining to appear after injury. To sum up, as far as the available literature shows, indirect siderosis may manifest itself by iritic discoloration in about three weeks and by siderosis lentis as early as within six weeks; and direct siderosis lentis as early as in eight days. Our cases show discoloration of the iris as early as eighteen days (case 10), indirect siderosis lentis as early as ten weeks (case 13), and direct siderosis lentis as early as seven

SIDEROSIS BULBI

| Findings of Medical Department Bureau of Workmen's Compensation | nd Results as of last examination | F.B. Location | Path of Entry | Time F.B. Remained | Siderosis First Recorded After Accident |
|---|---|---|---|---|---|
| 16 months after accident: typical old siderosis, large yellow mass in lens. Finally total cataract. | L. Pr. | X-ray negative | "9 o'clock" cornea, iris, and lens. | 2 years at last exam. | 16 months |
| 6 months after accident: O.D., pigmented deposits on Descemet's membrane; iris atrophic; subcapsular rust deposit in lens; posterior cortical opacities; meridional upper nasal chorio-retinal rupture. O.S., pigmented deposits on Descemet's membrane, pigmented striæ on anterior cortical periphery of lens; central chorioretinitis. V=20/40 | O.D. 20/200<br>O.S. 20/40 | X-ray upper nasal posterior vitreous. | "7 o'clock" cornea, iris and lens. | 6 months at last exam. | 6 months |
| 54 days after accident: foreign body in lens, brown pigment along intra-lenticular track; 2 months after, f.b. removed; later total cataract and hypertension. | L. Pr. | Center of lens | "12 o'clock" cornea and lens. | 4 months at last exam. | 54 days |
| 4½ years after accident large yellow leaflike subcapsular axial mass in lens. | 20/200 | X-ray negative | Cornea clear, "8 o'clock" iris and lens. | 5½ years at last exam. | over 4 years |
| 15 months after accident, stationary. | 20/20–3 | X-ray negative | "6 o'clock" cornea and iris (dialysis). | 15 months at last exam. | 45 days |
| 3 months after accident, typical siderosis. | L. Pr. | X-ray anterior lower temporal vitreous. | ? | 3 months | 3 months |
| 11 months after accident: brick-colored, triangular subcapsular axial mass, smaller round mass at "3 o'clock" halfway to equator, with recession of about ½ mm. into cortex. | 20/200 | X-ray anterior lower nasal vitreous. | "3 o'clock" cornea, iris, and lens. | 4 months | 9 days? |
| 9 months after accident: subcapsular zigzagging, annular wreath of brown deposits, brown dots, and vacuoles in lens. | 20/60 | ? | ? | 5 months | 9 months |
| 1½ years later iris still faintly discolored. | 20/66 | Anterior lens. | ? | 2 months | 7 weeks |
| 5 months later V.=20/20 with true siderosis; 9 months after accident: siderosis; lens opacification progressed until V.=20/100 | 20/100 | Lower nasal ciliary body? | "9 o'clock" at limbus. | 3 weeks | 18 days-discolored iris. 5 mos. later, typical siderosis lentis. |
| 9 months after accident, fine dotlike siderotic lens changes. | 20/20–3 | X-ray lower nasal anterior vitreous. | Lower nasal cornea and iris. | 6 months | 9 months |
| 2 months after removal iris still discolored, fine powdery capsular deposits uniformly distributed, corneal scar, iris hole and posterior radial lens opacity in lower nasal quadrant. | 20/20 | Ciliary body at "6 o'clock" | "7 o'clock" in cornea and iris. | 5 months | 5 months |
| 2½ months after accident, fine subcapsular pigment dots. | 20/50 | In retina near posterior pole. | "5 o'clock" cornea and iris. | 3 months at last exam. | 2½ months |
| 2 years after accident, typical old siderosis. | 20/200 | Lower temporal scleral wall. | "8 o'clock" at limbus. | 2 years at last exam. | 2 years |
| 2 years after accident, local siderosis: an inner zone of large brown masses and an outer zone of fine brown dots. | 20/20 | Lower nasal cornea. | Lower nasal cornea. | 2 years at last exam. | 2 years |

weeks following entry (case 9). Case seven requires further consideration. A diagnosis of siderosis was reported as early as nine days after injury, but an extra-lenticular foreign body was not extracted until four months later, and, when seen at the Bureau afterwards, presented a large, triangular, rusty mass axially, with a tendency to bury its edges in the cortex. The significance of the large axial rust masses is somewhat uncertain. They were found in three other cases with negative x-rays (cases 1, 4, and 5), and provisionally are regarded as intra-lenticular or ciliary-body cases, differing markedly from the typical crown of Samelsohn found in extra-lenticular cases, and therefore

as cases of direct siderosis. It should be pointed out that the *first observation* of siderosis, when claimants are seen at very long intervals, whether at the Bureau, or by attending opthalmologists, is not at all identical with its *first appearance*. Frequent slitlamp observations might conceivably have revealed siderosis much earlier, probably even earlier than iritic discoloration, which, depending as it does on the trained color discrimination of the observer and on the color of the iris of the observed, is necessarily a more erratic sign on which to depend. It may therefore be concluded that the behavior of magnetic foreign bodies with regard to siderosis as well as in other ways is incalculable, and no categorical statement as to the minimum length of time that siderosis takes to manifest itself is justified.

Further study shows that in five of our cases the foreign bodies had been overlooked (three were diagnosed only at the Bureau) but were still retained when last seen. In seven other cases the foreign bodies were extracted in from three weeks to six months after injury. Only three cases were unavoidably retained, although the diagnosis had been made. In the twelve overlooked cases, the slitlamp showed a point of entry in the cornea in seven cases; a hole in the iris in seven; a positive x-ray after diagnosis of siderosis in nine. In other words, some conditions that would have led to an early diagnosis were present in almost all of them, had they had an early examination by an ophthalmologist. In addition, while two cases showed an "abrasion" of the cornea, and four cases corneal foreign bodies, six had more important lesions, such as subconjunctival and intraocular hemorrhages; persistent mydriasis in four cases (cases 4, 10, 11, and 12); subnormal vision; a fundus lesion, described as a retinal detachment, to warrant further search for a foreign body.

Cases 8, 9, 11, and 12, show that siderosis is generally arrested by extraction, even as late as six months after injury. No case of disappearance of siderosis has been noted in this series, although Vogt[9] reports one; on the other hand, case 10 shows unchecked progress of siderosis after early extraction. Case 6 showed at first, after removal of f.b. siderosis lentis, intra-lenticular-track siderosis. Case 7 shows the interesting phenomenon of the burying of a peripheral subcapsular brown mass in the cortex after eleven months of observation, analogous to the "Abdrängung" phenomenon described by Vogt as occurring in the later anterior rosettes. Case 15 shows the very slow but unmistakable development of direct corneal siderosis after two years of retention. Case 2 is provisionally regarded as exhibiting sympathetic ophthalmia, and this case and case 13 exhibit the possibility of a mixed hematogenous and xenogenous siderosis. Since the problem of differential diagnosis from chronic uveitis and hematogenous siderosis occasionally exists, Coppez's[10] suggestion of a chemical analysis of the aqueous humor as an aid might be useful.

Age seems to have been no factor in the behavior of siderosis, nor has occupation been the determining factor in the occurrence of magnetic foreign bodies. There is moreover a curious preponderance of right eyes among the overlooked cases.

## Conclusions

The large number of overlooked foreign bodies in the eye and of siderosis bulbi that have been observed, with 50 percent of them leading to industrial blindness, is undoubtedly due, in the first place, to the fact that the claimant had not had the benefit of an early examination by an ophthalmologist. The failure to take advantage of x-ray, a too-ready acceptance of a negative x-ray as excluding the presence of a foreign body, and a hasty resort to the facile diagnosis of nontraumatic iritis are other contributing factors. In addition, pending litigation for a condition that is obviously, in the vast majority of cases, an industrial accident, the claimant is injured by putting on him the burden of proving one definite accident out of many probable ones that he may have experienced.

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# NOTES, CASES, INSTRUMENTS

## A NEW KNIFE FOR OPHTHALMIC SURGERY*

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During the last few years I have been using with very satisfactory results in all intraocular operations and in some minor operations on the eyeball knives made out of razor blade material.

Recently also, experiments in keratoplasty were carried out in which knives made out of razor blade material were used with quite satisfactory results. When the sections made by these knives were studied microscopically, it was found that the edges of the incision were very clean, without the slightest sign of traumatism. Encouraged by the good results obtained using these knives in both experimental work and in operating on human eyes, I have devised a knife to be used in ophthalmic surgery for all kinds of operations on the eyeball and adnexa.

The knife (fig. 1. A and C) comprises a handle with a quick acting mechanism which allows the rapid change of very sharp blades made out of razor blade material. The blades (fig. 1. D and E) are 37 mm. long and 2 or 3 mm. wide, to suit the requirements of different operators. The material selected for making these blades is the best steel used in the manufacture of razor blades and has sufficient thickness to avoid excessive flexibility. The handle (B-1) is hollow, having therein a slidable blade (B-2) provided with jaws (B-3) in one end to hold the blade (B-4) and a screw (B-5) in the other end which by turning, brings the jaws together and tightens the grip on the blade.

To remove the blade (fig. 1. C) the screw (5) is turned outwardly as shown in the full lines. The screw is then thrust inwardly and into the position shown in dotted outline (5′).

The forward movement of the chuck releases the jaws (3) and permits them to spring open to their normal position as shown in the dotted line (3′), thereby releasing the blade (4) which may now be freely removed. The various parts of the knife may then be dis-assembled and sterilized.

To re-assemble the knife, the chuck is inserted into the handle at its forward end and the thumb screw is started in, in the threaded portion of the chuck. A new blade is then inserted in the jaws

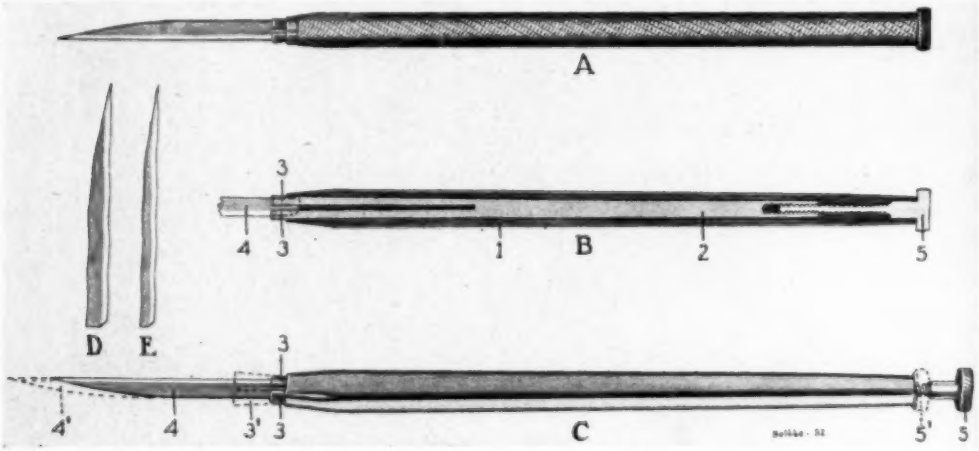


Fig. 1 (Castroviejo). A new knife for ophthalmic surgery.

* Presented before the Chicago Ophthalmological Society, Dec. 21, 1931. From the department of Ophthalmology of the College of Physicians and Surgeons, Columbia University, New York.

of the chuck and the thumb screw is then tightened. The tightening movement tends to draw the chuck wedgingly into the handle, causing the jaws to fit tightly on the blade when they come in contact with the inner portion of the handle.

The head of the screw, being of larger diameter than the handle, abuts against it and the knife is now ready to use.

It will be apparent from the above that new blades may easily and instantly be inserted to replace the old ones at a moment's notice; and this sometimes becomes necessary in surgical work.

It has been necessary heretofore to have the complete surgical knife sent out for sharpening after it has become dull. This is obviated with the new knife in which the old blade is readily removed and a new inexpensive one is inserted.

When the knife is to be used for a cataract operation where the whole length of the cutting edge is required, the blade is inserted into the handle only a few millimeters, but for operations on the eyelids, where more resistance is found, it is better to introduce half of the blade into the handle, thereby increasing the rigidity of the instrument.

The handle is made in two different shapes, square and round as shown in the figure. Its size is about the same as other handles used in eye work.

I wish to express my appreciation to Dr. Bustamante, who first suggested to me the use of razor blade material for surgical purposes and to G. Little and V. Mueller for their cooperation in making the knives.

The instrument is made by V. Mueller and Company, 1835 W. Van Buren Street, Chicago, Illinois.

Presbyterian Hospital.

## CORNEAL CAUTERY FOR HIGH MYOPIC ASTIGMATISM

RODERIC O'CONNOR, M.D.
SAN FRANCISCO

Miss S. consulted me first on April 15, 1922. There was a history of measles in early childhood after which the eyes were "very bad till the tenth year". She complained of more or less permanent congestion and discomfort with occasional severe exacerbations one of which brought her to me. There were numerous faint corneal maculae which reduced the vision somewhat. Local treatment was used until June 30, on which date the following correction was given: O.S. —2.00 D.sph. ⌯ —7.00 cyl. ax. 45°, vision = 20/40.

One year later the refraction was —8.00 cyl. ax. 40° with the same sphere as before. There was great annoyance from this high cylinder and the congestion persisted. Corneal cautery was suggested after a full explanation, consented to, and performed on June 5, 1923. It was done as a 2 mm. band at right angles to the myopic axis and extending from the pupillary margin well into the pericorneal tissues. This was in the lower inner quadrant of the cornea.

The progress has been as follows:

July 31, 1923:—1.00 D.sph. ⌯ —4.00 cyl. ax. 180°, V = 20/40+.

July 25, 1928: —1.00 D.sph. ⌯ —3.50 cyl. ax. 180°; V = 20/40+.

March, 1931: —5.00 D.sph. ⌯ —1.00 cyl. ax. 180°; V = 20/40+.

August, 1932: —5.00 D.sph.; V = 20/40+.

There has been entire absence of discomfort and congestive attacks since the operation and the vision has remained 20/40.

It would be interesting to know why the astigmatism has changed almost as much in the last four years as it did immediately after the operation. It will be noted that it was apparently increasing before operation.

The result shows that in selected cases of regular astigmatism corneal cautery offers a chance for relief from the annoyances of strong cylinders.

450 Sutter street.

## A MELANOTIC SARCOMA, ARISING FROM AN AREA OF CHORIORETINITIS

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It is very seldom that an intraocular new growth can be followed from its beginning to its examination under the microscope. The following case report

would certainly make one believe that chorioretinitis can be an exciting cause of tumor, as in this case a melanotic sarcoma of the choroid followed a chorioretinitis.

W. M., male, aged 68 years, came to me on September 8, 1930, complaining of hazy vision in the right eye, which had been present four months. He had not had any pain or inflammation of the eye. Vision O.D. = 6/15+ and J.5. Tension was normal. External examination was negative; iris reacted promptly to light and accommodation; media clear. The nerve was round, with

Fig. 1 (Glover). The tumor occupies the right half of the globe, and is attached to the choroid. Note that the optic nerve is uninvolved. Considerable hemorrhage is scattered throughout the tumor. The retina is completely detached. Photomicrograph ×6.

a central physiologic cup. The vessels were slightly sclerotic. Over the nasal periphery of the fundus extending from "3 to 5 o'clock" were the remains of a large subretinal hemorrhage, with smaller absorbed areas of hemorrhage lying nearer the disc below on the nasal side. The macular area and temporal side were negative. Vision with the left eye was 6/6 and J.1. This eye was essentially negative.

The physical examination showed a normal blood picture and blood pressure. Eight infected teeth were drawn. The tonsils were diseased.

On October 30, 1930, the patient developed an iritis in the left eye, which promptly cleared on removal of the tonsils. By December 2, 1930, the left

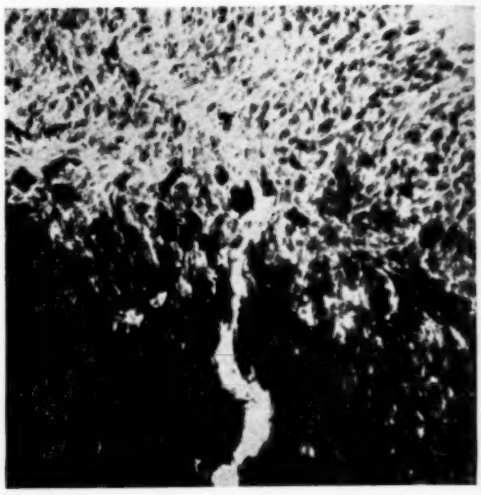

Fig. 2 (Glover). The tumor in the lower half is deeply pigmented while that above is relatively free from pigment. In the latter area the morphology of the cell is well brought out. Photomicrograph ×100.

eye had cleared and the hemorrhage in the right eye had been completely absorbed, leaving large areas of chorioretinitis on the nasal side. Vision with

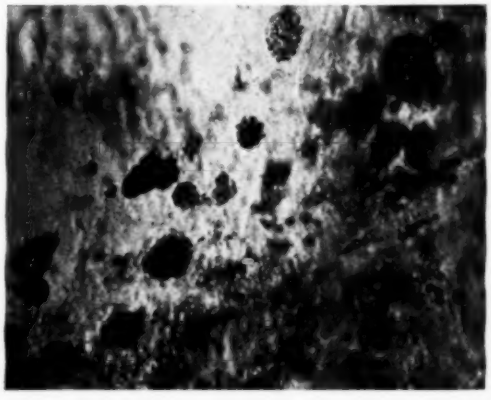

Fig. 3 (Glover). Note the varying amounts of pigment in the tumor cells. Photomicrograph ×350.

+.75 D.sph. ⊂⊃ + .25 cyl. axis 165° = 6/9+ and J.2. The field had improved.

The patient was followed up every month until July 22, 1931, during which time there was no recurrence, the vi-

sion remaining as before. On October 8 he appeared, complaining of loss of vision in the right eye, which was found to be reduced to 6/12. He now had what appeared to be a large serous retinal detachment of the whole area of chorioretinitis. This remained stationary until February 3, 1932, when he found he could not see with the eye and now had a total detachment of the retina. As transillumination seemed all right nothing further was done. On June 1, 1932, he suddenly developed an acute glaucoma and two days later the globe was enucleated and a gold-ball implant done.

The gold ball was hastily removed on June 10, when Dr. Boesinger of the Altoona Hospital made a diagnosis of melanotic sarcoma. The globe externally did not show any signs of malignancy. Dr. H. L. Stewart of the department of Pathology, Jefferson Medical College, then gave me a report, that the tumor was malignant melanotic sarcoma probably arising from the choroid, with no evidence of infiltration of the optic nerve. The sarcoma was over the corresponding area of choroiditis.

The patient was at once given heavy doses of radium and x-ray, following which the socket healed nicely. It is too early to tell if any metastasis is present but so far the left eye has preserved a normal field and vision.

I am indebted to Dr. David Morgan and Dr. Stewart of Jefferson Medical College for the excellent photomicrographs of the eye.

**Conclusion.** A melanotic sarcoma can arise from an area of chorioretinitis within the short period of eight months.

1200 Fourteenth avenue.

# SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

## ROYAL SOCIETY OF MEDICINE, LONDON

### Section of Ophthalmology

October 14, 1932

Mr. A. C. Hudson, president

**Arachnodactyly with dislocated lenses**

Mr. C. A. Hudson presented a brother and sister, members of a family of four children all of whom showed the same condition. The fingers were slender, there were deformities of the bones of the chest and the appearance of the head suggested acromegaly.

A special needle, bent at an angle of one hundred and thirty-five degrees, was used in cases of dislocation of the lens. This was introduced at the inner side and transfixing the lens held it so that needling with another instrument could be successfully performed. Dislocated lenses were slow to absorb after needling.

**Pemphigus of the conjunctiva**

Mr. C. A. Hudson showed a case of this condition in a woman. It appeared immediately after a severe attack of measles, with a purpuric eruption of the chest and arms and buccal lesions possibly pemphigoid. Four months later there was skin eruption but the conjunctival involvement was causing gradual blindness.

**Discussion.** Mr. M. S. Mayou said that he had had a patient, a six-year-old boy, who had a shrinking conjunctiva and keratinization. Liquid paraffin was used three or four times a day, and the cornea had not become opaque. The loss of vision in these cases was due to keratinization of the cornea.

**The relative merits of methods of dealing with senile cataract**

Mr. Hudson said that when he was house-surgeon at Moorfields, 25 years ago, he was deeply impressed with the serious consequences liable to result from prolapse and incarceration of the lens capsule and iris in the incision after both combined and simple cataract extractions. Shortly afterwards he saw the operation of extraction with peripheral iridectomy performed by Hess, and as this seemed to afford a safeguard against the accidents incidental to other methods, he forthwith adopted it and had continued it as a routine procedure to the present time. The credit for the inception of this operation was due, he said, to Beccles Chandler, of Boston.

Mr. Hudson submitted an analysis of 485 consecutive cases, with the object of discussing the complications, and to give an opportunity for estimating the relative claims for extracapsular and intracapsular extraction.

Incarceration of the lens capsule in the incision was not seen or suspected in any of the cases. It might be claimed that the same could be obtained with complete iridectomy if the iridectomy were deferred until the lens had been delivered and the iris replaced: but, even so, the great value of the preservation of the sphincter, from the points of view of appearance and function, could not be gainsaid. The intact sphincter also antagonized the forward displacement of the iris towards the incision. Prolapse of iris occurred in six percent of the cases, but in seventeen of the thirty cases of prolapse it was found possible to replace the iris, with or without peripheral iridectomy.

On the question of the cause of prolapse of iris Mr. Hudson said loss of tone of the iris from excessive twitching of the sphincter during delivery of the lens no doubt increased the liability, but probably the presence of lens remnants behind the iris was the most important local factor. For that reason it was advisable he said, to use homatropine before the operation, so as to facilitate evacuation of the lens, and of atropine at its termination in order to afford as free a passage as possible forwards through the pupil for the lens debris.

Loss of vitreous occurred in three of

the cases, but this figure was of little value for the purpose of comparison with results obtained in intracapsular extraction, because in most of his cases in which vitreous loss was either anticipated or had occurred, a complete iridectomy had been done. The percentage loss of vitreous had therefore been calculated for all cases of cataract extraction with limbal incision operated upon during the period reviewed (1916-32). This figure was two and nine-tenths percent for a total of 550 extractions.

Concerning the seriousness of loss of vitreous, much, he said, depended on the consistence of the vitreous in the case. In this respect a fluid vitreous was least harmful, as it could be lost in considerable quantity without forming an entanglement in the wound.

As a safeguard against loss of vitreous in extracapsular extraction, the most important factor was the use of special lid retractors.

In any case of cataract in which living capsular epithelial cells remained, sooner or later the sight would deteriorate, sometimes to a remarkable extent, not only from thickening but also from wrinkling of the capsular membrane. For this reason in most of the cases a capsulotomy was performed.

(Reported by H. Dickinson)

## BALTIMORE CITY MEDICAL SOCIETY

### Section of Ophthalmology

December 7, 1932

Dr. Harry Friedenwald, chairman

**Walter Baily and Richard Bannister**

Dr. W. H. Wilmer, in speaking of Walter Baily, the first writer in English on the eye, called attention to the interesting papers by Dr. L. H. Taylor in 1917, and by Dr. Casey Wood in 1920, upon this early ophthalmologist. In addition to the photographs of the titles of various editions of Baily's monographs, Dr. Wilmer showed a rare edition printed in London by Robert Waldegrave for Thomas Mann and William Brome (159–). The only other known copy was in the Library of Cambridge University, England. Dr. Wilmer also exhibited the final edition of 1654. There was one copy in the British Museum, and there might be other copies in existence. Dr. Wilmer also passed around another printing of Baily's monograph edited in 1622, by Richard Bannister, who added his own "Breviary" to Baily's translation of Jacque Buillemeau's "Worthy Treatise of the Eyes", without giving any credit to Baily. The "Breviary", however, showed that Bannister was a keen observer and far ahead of his times. This edition was a curious little volume, interspersed with poetry, anecdotes and a ghost story, but it was of great interest because he mentioned hardness of the eye as a symptom of glaucoma. "If one feels the Eye by rubbing upon the eielid, that the Eye be growne more solid and hard, than naturally it should be." This volume was dedicated to the Earl of Rutland and was dated Stamford, last of June 1621.

**Some experiences with contact glasses**

Dr. R. T. Paton and Dr. Frank Walsh discussed some of their experiences with contact glasses. Dr. Paton gave a short histological sketch of the use of contact glasses which were first mentioned in 1827, on through their use for conical cornea in 1879 by Rohlman, up until the present day when Zeiss in 1911, began to make them for general use. Dr. Paton spoke of the use of contact glasses in aniridia and albinism, spastic entropion, corneal ulcer, keratoconus, in plastic operations and in ophthalmoscopy.

**Retinal angiospasm**

Dr. David Freeman said that K. Mylius' monograph on "The Functional Changes in the Vascular System of the Retina" was used as a basis for his paper. Mylius had attempted to establish as indisputable fact, by the use of fundus photography, the presence of angiospasm in the retinal arteries. The frequent occurrence of angiospasm in the toxemias of pregnancy and in polycythemia was demonstrated by a series of fundus pictures. Angiospasms were

usually seen in very sick patients whose blood pressure was distinctly elevated, the systolic pressure generally ranging from 150 to 190 mm. and the diastolic pressure from 110 to 130 mm. The urine was loaded with albumin; nausea, vomiting, headache, and spots before the eyes were the outstanding symptoms. Long and careful study of the fundus was important for the demonstration of angiospasm. A constriction would be found usually in the upper or lower nasal branch of the central retinal artery and near the disc. The constrictions shifted from time to time, and might disappear while being viewed. A granular condition of the blood column, "granular streaming", could be seen just distal to the constriction. Several arteries might be involved simultaneously in one eye. The spasms might persist for days, but they usually disappeared upon the interruption of the pregnancy or with clinical improvement following rest in bed.

William M. Rowland,
Secretary.

## LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

October 31, 1932

Dr. Dean Godwin presiding

### Ophthalmology in China

Dr. Dennis Smith opened the program with a description of his twelve years of ophthalmological practice in Peking, China. The diseases most commonly encountered were trachoma, syphilis, and tuberculosis. In his experience the prophylactic use of one-half percent zinc sulphate solution in the eyes of school children seemed to diminish the incidence of trachoma. In general the Chinese were myopic, but glaucoma was frequent and detachment of the retina not more common than in Americans. In spite of the high frequency of trachoma, most of those eyes affected with glaucoma appeared to be non-trachomatous. It seemed to Dr. Smith that the hyperemia caused by trachomatous infection probably diminished the tendency toward hypertension and glaucoma in those individuals afflicted with trachoma. Treatment of chronic cases was unsatisfactory because patients disappeared as soon as they were improved, without completing their cures. The native Chinese barber was a big factor in the spread of trachoma and syphilitic infections by his uncleanliness. Phylctenular conjunctivitis was common and unusually severe. Training schools had to train both male and female nurses, as female nurses were not allowed to care for male patients. Nurses were under the supervision of a national board of examiners which kept nursing standards rather high.

Glasses were considered as a cure for eye diseases or as a badge of rank rather than a correction for errors of refraction and the material from which the lenses were made was thought of greatest importance. Glass lenses did not have the curative value of lenses of crystal or other natural substances. The native lenses were usually planos and a person of inferior rank had to remove his glasses before one of superior rating.

Keratomalacia, due to vitamin deficiency, was very common as a result of the Chinese diet. Strabismus was frequently seen and in several cases correction of this defect resulted in satisfactory matrimonial results for the sufferer. Gonococcus and inclusion body blenorrhea were not uncommon.

**Discussion.** Dr. Solomon Reina remarked that in Palestine the prophylactic use of one-half percent zinc sulphate solution used twice weekly helped diminish the incidence of trachoma. However, he believed trachomatous eyes were predisposed to glaucoma because of the pericorneal scarring. Hemeralopia and retinitis pigmentosa were also frequent in the Orient.

### Hydrophthalmos

Dr. Boyce said this condition was apparently more frequent than generally supposed because five percent of the blind in the Missouri school, as re-

ported by Dr. Harvey Lamb, suffered from hydrophthalmos. After a discussion as to various theories of etiology one case reported by Dr. Spratt was mentioned in which a trephine operation was done in 1913, and the patient still had a ten degree field in 1930.

Dr. Boyce presented a patient first seen at the age of four months, at which time the child had a definite bilateral hydrophthalmos with a corneal diameter of 13 mm. The pupils were small with no reaction to light. The corneas were hazy. The anterior chambers were deep and there was marked photophobia. This infant was the second born; the first born had a history of a similar condition for which a trephine operation had been done in one eye and an iridectomy in the other at the age of eighteen months. Both eyes were ultimately enucleated as the operations did not prove successful. In view of the failure of iridectomy and trephination to control the tension in the first child and because of the general failure of these operations in all cases reported, Dr. Boyce decided to try iridotasis on one eye and iridencleisis in the other with his patient. Accordingly, on February 20 iridotasis was done on the left eye, although the iris partially slipped back into the anterior chamber. A few days later an uneventful iridencleisis was done on the right eye. At the present time both corneae were clear, the fundi visible; there was a myopia of approximately 20 diopters and the photophobia had disappeared. The result in the right eye upon which the iridencleisis was done appeared to be the better of the two. No other members of the parent's family were known to have the disease.

Dr. Boyce mentioned one other case of buphthalmos which he had seen develop following a perforating ulcer which caused anterior synechiae. Therefore, it would seem that blockage of drainage from the iris angle from any cause, might be sufficient to produce this condition.

**Discussion.** Dr. Solomon Reina reported a case of infantile glaucoma with megalocornea in which he did a trephine operation without iridectomy. The photophobia disappeared, but the tension was not much diminished.

Dr. Samuel Abraham mentioned a patient operated on by Dr. E. V. L. Brown in whom the tension remained normal and a visual acuity of 0.5 was obtained. Trephining, with iridectomy was done. Anterior chamber puncture of an hydrophthalmic eye by Dr. Kronfeld showed a content of about 1 cc. of aqueous with a refilling time slowed to three to four minutes. This would indicate a blocked outflow as the underlying cause of the condition.

Dr. Julian Dow asked Dr. Boyce as to the appearance of the papilla in the patient last mentioned by him, who was now fifteen years old and blind.

Dr. Boyce replied that the fundus was not visible in this eye. The infant which he successfully operated on had a small conjunctival drainage bleb in each eye. He thought the most peculiar feature of the case to be the presence of the defect in both children of parents with a negative family history.

**Embolism of the central artery of the retina**

Dr. Julian Dow reviewed the treatment of embolism of the central artery of the retina mentioning amyl-nitrite, sodium nitrite, intraorbital atropin injection, acetyl-choline, pilocarpin, massage, and paracentesis of the anterior chamber as therapeutic measures now in general use. A case was reported of a woman seen within twenty-four hours of the occurrence of an embolism of the central artery where amyl-nitrite was administered, immediately followed by sodium nitrite and paracentesis of the anterior chamber with massage. The treatment caused no appreciable improvement in vision. Dr. Dow thought that acetyl-choline should be used in the treatment of future cases because of the favorable results reported by French observers.

**Discussion.** Dr. Theodore Lyster showed photographs of sections of the retina of dogs where experimental emboli had been produced. The immediate change around the vessel was edema of the retina.

Dr. Solomon Reina stated that spasm

could be differentiated from embolus by pressure on the eye which would produce arterial pulsation in the case of spasm.

Dr. Rogers inquired as to the frequency of arterial embolism, mentioning that he had seen three cases in his first two years of practice.

Dr. Dow thought that spasm might be differentiated from embolus by the administration of acetyl-choline, which drug would completely remove spasm after two or three injections. Any treatment which might yield results was justifiable because without treatment the eye was lost.

**Pre-retinal artery**

Dr. Harold Whalman showed drawings of fundi where a pre-retinal artery occurred as an incidental finding in both eyes of an individual who presented himself for correction of a moderate degree of myopia. The inferior temporal artery of the right eye twisted on itself about four turns a short distance from its origin, and the loop thus formed extended out free into the vitreous. A similar less marked anomaly affected the corresponding artery on the left side. Aside from a moderate myopia, both eyes were normal.

M. F. Weymann,
Recorder.

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## MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

October 11, 1932

Dr. J. J. Shea presiding

**Epithelioma of caruncle**

Dr. E. C. Ellett presented Mrs. D., who was seen in the fall of 1927, then aged thirty-seven years, with a small warty growth involving the left caruncle and a somewhat similar lesion on the edge of the right lower lid. The lesions were both excised and the sections showed small projections of epithelial cells possessing a central core and apparent limiting membrane. Dr. Fleming made a diagnosis of epithelioma. Two x-ray treatments were given and there had been no recurrence of either growth.

**Corneoscleral trephining and iridotasis for chronic glaucoma**

Dr. E. C. Ellett presented Mrs. S., aged seventy-six years, who was seen in 1929, on account of failing vision. Both eyes showed incipient cataracts, cupping of the discs, and tension of 43 mm. and 37 mm. The vision in the right eye was 20/25, left eye moving objects. A corneoscleral trephining with complete iridectomy was done in the right eye in April, 1929, and an iridotasis with incision of one pillar was done in the left. In June, 1932, the tension in the right eye was very low and the vision 5/30. The vision in the left eye with glasses was 5/5 and J. 1, tension 26 mm.

**Sarcoma of ciliary body**

Dr. E. C. Ellett presented Mrs. H., aged sixty-four years, who was seen in April of this year complaining of a black spot before her left eye. The vision with correction was 6/6 and 6/15, tension 18 mm. and 30 mm. in the right and left eyes respectively. The left eye showed a pigmented tumor growing from the ciliary region, pushing through the root of the iris which was wrinkled and presented as a dark area at this point. The eye was removed and the tumor found to be a melanotic sarcoma.

**Sarcoma of ciliary body**

Dr. E. C. Ellett presented Mrs. R., aged fifty-eight years, who complained of a blur before her left eye. The vision in this eye was 6/6. There was a pigmented tumor growing apparently from the ciliary body below. The tension was 26 mm. in each eye. Several x-ray treatments were without apparent effect.

**Hypopyon ulcer of cornea**

Dr. A. C. Lewis presented Mr. H. F., who was first seen on March 1, 1932. Two days before this a fragment of coal struck the left eye. Examination showed a large central abrasion and a

deep infected ulcer over the lower pupillary margin. The ulcer was irrigated, curetted and cauterized with phenol; atropine instilled and dressing applied. Atropine, dionin, mercurochrome and hot packs were prescribed.

On March 28, the eye was making a good recovery but showed a large scar over the lower half of the cornea.

The actual cautery had been used on the ulcer twice; the patient hospitalized and found to be a diabetic. The diet was adjusted and foreign protein given first in the form of milk and later as typhoid vaccine intravenously.

**Discussion.** Dr. Stanford said that in his hands cauterization of ulcers of the cornea was without value for the reason that the cautery could never reach the entire diseased area. He said no foreign protein therapy was of value unless it caused definite temperature reaction.

### Cilium in anterior chamber

Dr. James B. Stanford presented Mr. J. V., who was struck in the left eye by a flying nail on August 18, 1932. There had been a perforation of the cornea in the superior nasal quadrant with anterior synechia. A cilium was found in the anterior chamber.

On September 28, the synechia was freed by a knife-needle and an unsuccessful attempt was made to remove the eyelash. There were some lens opacities. Dr. Stanford expected to remove the cilium when the eye became quiet.

### Sarcoma of orbit

Dr. Phil M. Lewis presented B. S., a white boy, aged eight years, who was first seen July 29, 1932. A growth at the inner upper angle of the left orbit had been noticed by the patient's family about seven months previously. It had been diagnosed a cyst and removal attempted through an incision in the upper lid in February. The mass was reported to be not a cyst but a soft solid tumor. Only a piece of it was removed and subsequently reported by a pathologist to be a spindle-cell sarcoma. A series of x-ray treatments was ordered by his physician and was given at the Memphis General Hospital. The mass had continued to enlarge and push the eyeball outwards and downwards.

Examination showed the right eye normal. On the left there was a small scar of the inner portion of the upper lid from the previous operation. The globe was displaced outwards and downwards and the motion up and in was very limited. A firm rounded mass was definitely palpable in the upper inner quadrant of the orbit. Vision in the eye was greatly reduced and the upper inner portion of the retina was detached. There was no evidence of metastasis.

Immediate operation was advised; exenteration of the orbit being thought necessary. The patient's mother however delayed the operation until August 16, seven months after the first examination and eight months since the growth became noticeable. During this delay several other ophthalmologists were consulted and all advised immediate operation.

Incision through the conjunctiva immediately exposed the growth which was found encapsulated and was shelled out intact. It was shaped like an English walnut and measured approximately 4.5 cm. in length and 3 cm. in diameter. The tumor tissue proper was quite soft but it had a definite fibrous-tissue capsule about 4 mm. thick. Bleeding at operation was very limited. Exenteration of the orbit was not performed. The growth was examined by Dr. J. A. McIntosh and found to be a spindle-cell sarcoma.

Roentgen-ray treatment was started the week after operation by Dr. H. Pulliam and was being continued. Vision had improved to 20/50 and the retina had reattached. The boy looked and felt well and had gained 15 pounds in weight the past year. Recurrence and metastases were expected. He said that later presentation or reports on his patient would be made.

**Discussion.** Dr. Ellett said he thought it unusual to have a sarcoma of the orbit, of this duration, so completely encapsulated.

**Cicatricial ectropion**

Dr. Phil M. Lewis presented N. M., aged thirty-three years, referred by Dr. Louis Boyd on April 4, 1931. This man was in an automobile accident about three months previously and both lids of the right eye were severely lacerated. Healing of these wounds resulted in marked deformity. The lower lid was everted, its border bound down to the cheek, while the upper lid was also everted and notched centrally. The conjunctiva of both lids was thickened and granular from exposure, although the patient had worn a patch constantly since the injury. The globe was not damaged and vision was normal.

A plastic operation was performed on April 21, 1931. Considerable scar tissue was excised, the lids united and true skin grafts inserted in both upper and lower wounds. The upper graft was taken from the left upper eyelid and the lower from the temple. Both grafts took nicely.

R. O. Rychener,
Secretary

## MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

### Section of Ophthalmology

May 13, 1932

Dr. Douglas Wood presiding

**Operation for indolent ulcers of the cornea**

Dr. W. W. Lewis (St. Paul) said that for several years past he had treated indolent corneal ulcers by the use of Kuhnt flaps, and imitated nature by encouraging a fasiculus of vessels to extend from the limbus to the ulcer in a trough made in the cornea. The depth of this trough was through Bowman's membrane into the superficial layers of the substantia propria. This procedure, to include the making of the flap, while of entire satisfaction, necessitated hospitalization and disability of from ten days to two weeks.

Dr. Lewis said, on account of the disability, he had tried the effectiveness of this surgically-made trough alone, without the flap, in his last two cases. These two cases (which for years had been irritable, chronically injected eyes) were now, and for several months had remained, clear and free from all irritation and congestion. The trough was formed by making two parallel incisions beveled toward one another through Bowman's membrane into the superficial layers of the substantia propria of the cornea, extending from the ulcer to the limbus, and curetting out the V-shaped trench.

**Discussion.** Dr. H. J. Rothschild (St. Paul) said that the use of foreign protein had helped in some of these cases and he wondered about Dr. Lewis's experience.

Dr. Lewis stated that he had used foreign protein, milk, triple typhoid, and others but could get no lasting results. The ulcer would heal and stay quiet for a week or two and then break down again. He had operated on this man for three ulcers and each one had remained healed thereafter.

**Healed corneal wound; vitreous opacities**

Dr. J. H. Gammell (Minneapolis) reported the case of F.R.B. a laborer aged forty-eight years, who on July 17, 1930, while trimming trees, was struck in the right eye by a branch, resulting in a perforating wound of the upper temporal quadrant of the cornea with prolapsed iris and loss of aqueous. A conjunctival flap was made, covering almost the entire cornea. The flap remained in placed for nearly a month. Local and general treatment were instituted, including foreign protein therapy. In October with +1.00 D.sph. ⌯ +3.00 cyl. ax. 75° vision was 20/100. On January 8, 1931, a network of coarse opacities could be seen near or at the posterior capsule of the lens and anterior vitreous. On May 29, 1931, the eye had remained quiet and vision with glasses was 20/200. On May 7, 1932, the vision was 6/200 with and without glasses, and the vitreous opacities extended to the visual axis in a dense network giving the appearance of looking into a tapering wire basket with the apex more deeply located where the network was most dense. The left eye was normal.

**Unilateral vernal catarrh treated with radium**

Dr. C. N. Spratt (Minneapolis) reported the case of Marion B., aged twelve years, who had had vernal conjunctivitis in the left eye for the past two years. There had also been a corneal ulcer for several weeks. Dr. Drake had treated this patient with radium first on April 18 and again an April 25.

**Discussion.** Dr. Douglas Wood said he had seen this girl when she first came under Dr. Spratt's care, then showing the paving-stone-like growth of the conjunctiva. Dr. Wood said he had very satisfying results in these cases by massaging the lids with a one-half percent solution of copper sulphate.

**Frontal lobe brain abscess**

Dr. W. J. Kucera (Minneapolis) reported the case of S. S., a white man aged twenty-nine years, first seen by Dr. Kucera on March 28, 1932, eight weeks after the onset of the illness. On February 5, 1932, he developed scarlet fever. Four weeks later the left lid became swollen; an abscess broke, discharging a large quantity of pus for over two weeks. Increasingly severe headaches had developed.

Examination showed a bilateral papilledema of three diopters with recent and old hemorrhages. There was some other general evidence of intracranial disease but no localizing signs. The x-ray showed cloudiness of the frontal and maxillary sinuses. The temperature was normal; w.b.c. 16,100. A spinal puncture was not done.

On March 30, the left frontal sinus was opened. The posterior bone plate was necrotic. Through an opening in this wall the frontal lobe was explored with a trocar but no abscess was encountered. On May 12, the visual fields were contracted for form and color. Visual acuity was 20/25 in each eye. The general health had improved greatly; he walked thirty blocks a day. The papilledema remained.

**Discussion.** Dr. H. P. Wagener (Rochester) said it was rather remarkable that the choked discs had persisted so long if the patient did not have some cerebral complication. The question arose whether the edema of the discs could continue much longer without causing subsequent damage to vision. If there were evidences of commencing secondary atrophy, some such procedure as ventriculography or encephalography might be tried to attempt to localize the lesion or else a decompression might be done to relieve the increased intracranial pressure.

**Intraocular tumor masked by cataract and glaucoma**

Dr. John C. Brown (St. Paul) reported the case of a sixty-nine-year-old man who presented himself on April 4, 1928, with the history of having the right eye red and light-sensitive for a year and a half. The tension was high, and an advanced cataract made it impossible to see into the eye. There was some redness. Transillumination was not satisfactory. No history of a foreign body entering the eye could be elicited. The left eye was normal. Under pilocarpin and eserin the redness disappeared from the eye and by the end of eight days he was comfortable. There was free movement of the eyeball in all directions at this time, and a diagnosis of cataract and acute glaucoma was made.

He was sent home for ten days, and returned on May 4, 1928, at which time he was comfortable and had no further symptoms. As the eye was hard and blind, enucleation was advised in order to avoid any further trouble. This was refused and the patient went home saying he would return if any change took place.

The patient was next seen a little over a year after the last visit. The eye was bulging from the socket and the globe was only slightly movable to the nasal side. He stated that he had seen Dr. Nelson about a month before, that there was no proptosis at that time, but it was suspected that a tumor was developing.

He was placed in the hospital and in five days the tumor had markedly increased in size. This tumor seemed to arise from the floor of the right orbit toward the temporal side. It was firmly attached to the orbit and the eye could be pressed away from the upper wall of

the tumor. The general opinion was that the condition was an inoperable sarcoma. X-ray treatment was instituted by Dr. Schone. The tumor was very much reduced in size and all pain and pressure symptoms disappeared. He was sent home with instructions to return.

He did not return for another year, June 14, 1930, when he had an enormous tumor projecting from the orbit. He stated that the growth had remained quiet until about three months ago. This time he had metastases to the liver and stomach which were giving him symptoms for which he returned. X-ray treatments relieved the pains. He died about three months later in a Wisconsin town, but Dr. Brown said he was unable to obtain the specimen.

**Discussion.** Dr. Spratt stated that he had read an article in which 256 cases of unilateral glaucoma had been seen at Moorfields Hospital. Ten percent of these cases were found to have intraocular growths.

Dr. E. S. Strout (Minneapolis) believed there was quite a tendency to the development of sarcoma following serious injury to the eye or orbit. He recalled having seen four cases in one year, occurring in Dr. Wood's practice. At least two of these cases were in children.

**Intraocular foreign body**

Dr. Paul Berrisford reported on a boy, F. S., aged seventeen years. The vision in his right eye had been failing gradually since receiving a minor injury in the fall of 1930, at which time a .22 cartridge exploded. Immediately after the accident, the eye was a little irritated but caused him so little trouble that he did not consult a physician. For some months he had observed that the pupillary area appeared white. For the past week the eye was at times painful and watered continually.

A slight circumcorneal injection was noted; the cornea was clear. Near the root of the iris on the temporal side at about the position of "7 o'clock" was an opening 2 mm. in diameter. The lens was swollen and uniformly cloudy. Not even the red reflex of the fundus was seen. The tension of the eye was not elevated, and light projection was good in all directions. X-ray showed the shadow of a foreign body to the temporal side above the center of rotation of the eye.

It was concluded that the questionable advantage of enlargement of the visual field and the cosmetic effect resulting from cataract extraction was greatly offset by the danger from iridocyclitis, panophthalmitis or vitreous abscess and possible sympathetic ophthalmia through the stirring up of a vulnerable eye.

**Bilateral papilledema**

Dr. F. A. Loomis (Minneapolis) reported the case of a girl twenty-two years old who was sent to St. Mary's Hospital by Dr. Marsh for diagnostic study on January 19, 1932. Her subjective symptoms were headache, stiffness of the neck, dizziness and rapidly failing vision. Fundus examination showed an elevation of the nerve heads between two and three diopters. The retina was edematous and the vessels tortuous. All tests were negative so a spinal puncture was done, showing increased pressure. The temperature was not over 100° at any time. On January 27, Dr. Corbett performed a right subtemporal decompression, and a very large amount of fluid escaped. On January 30 (three days after the operation) the records showed that the patient was sitting up in bed reading. She was discharged from the hospital one week after the operation.

On April 2 she was last seen in Dr. Loomis's office, at which time vision in each eye was normal.

**Discussion.** Dr. A. S. Hamilton suggested serous meningitis as a diagnosis.

Walter E. Camp,
Recorder.

# AMERICAN JOURNAL OF OPHTHALMOLOGY

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## POSTERIOR EXTRACTION OF CATARACT

At the 1931 meeting of the Ophthalmological Society of Egypt, M. Bakry described this operation, which he had done, first on the eyes of animals, then on human eyes with absolute glaucoma; and finally on five cases of cataract, four of which were successful. Two of the cataract cases were shown at the meeting, several weeks after operation.

In the oldest description of a cataract operation, of couching, Celsus directed that the needle be introduced half way between the pupil and the outer canthus, through the sclera behind the iris. Later the plan of reclination by a needle introduced through the cornea was tried. Both plans for displacement of the lens are still used in the Orient, as illustrated by Elliot (Couching for cataract p. 14). Daviel used the corneal route for his couching operations. After failure in a certain case to clear the pupil in this way, he proceeded to extract the lens; and later did extraction in all cases. Bartisch, "the father of German ophthalmology," illustrated the operation, showing his manner of entering the needle through the sclera. After the time of Daviel, cataract extraction only slowly made its way to favor, because depression or reclination was the easier operation to do. The books of Laurence, 1842, and Wharton Jones, 1847, have illustrations showing the couching operation, with the needle introduced through the sclera behind the iris.

In his operation Bakry made a keratome incision, 11 mm. in length in the sclera, parallel to, and 8 or 9 mm. from the corneal margin. Through this incision he introduced, closed, looped forceps to grasp the lens. One limb of the forceps terminates in a round loop, the other in a blunt pointed loop. The pointer was pushed through the suspensory ligament, into the dilated pupil, through which it was watched. The round loop was thrust behind the lens. The forceps were then pressed together, to seize the lens and withdraw it. In one case the scleral incision was too small, and the forceps had to be withdrawn, and the impacted lens seized

and dragged out with ordinary fixation forceps. With a vitreous of normal, firm consistence, very little loss is to be expected, merely that adhering to the lens and forceps. The linear wound in the sclera does not tend to gape, and the vitreous is firmly attached to the ora serrata. Bakry believes, with other experienced operators, that a slight loss of vitreous is unimportant.

Perhaps a more serious danger is that of pull on the retina, that might start a detachment. Bakry places a stitch in the sclera, before making the incision, as some do for anterior extraction, like Kalt, Mendoza or Ellett. He also has an undine filled with saline solution to distend the globe before tightening this stitch; as deSchweinitz and others have found useful in eyeballs that show a tendency to collapse, after injury, or operation.

The possibility of starting a cicatricial process in the vitreous, that would lead to retinal detachment is, perhaps, the greatest danger of the posterior extraction. In Elliot's book, he mentions the percentage of detachment of the retina after couching, as 3.53. But these were only the cases in which such a diagnosis could be made with the ophthalmoscope. Among the 54 globes that were subjected to pathological examination, he found 38 with detachment of the retina.

However, Elliot ascribes these detachments generally to dragging on the retina, by cicatricial changes following infection of the vitreous; which must occur frequently from crude violence done to the eyeball by native couchers, without antiseptic precautions. He also says: "It has been suggested that the presence of the lens in the vitreous chamber brings about retinal changes. The author is not, however, aware of any reliable evidence, either ophthalmoscopic or pathological, to support this view. As far as possible, all cases seen in Madras were submitted to ophthalmoscopic examinations, whether the couching had resulted in success or failure. We were unable to discover any characteristic change which could be attributed to the couching. A large percentage of the fundi examined appeared to be absolutely normal". This seems to indicate that a posterior extraction with aseptic technic need not be dangerous, as a direct cause of retinal detachment.

As to hemorrhage in the posterior extraction, the incision used by Bakry was parallel to the corneal margin. He makes no mention of trouble from hemorrhage, but hopes to make it possible to use meridional section, parallel with the choroidal vessels. It is doubtful if the latter section would be any better, if made within 10 mm. of the corneal margin. The larger anterior vessels are arranged more nearly parallel with the major circle of the iris. Moderate hemorrhage into the tract of the wound furnishes, from the blood plasma, immunity colloids that are lacking in the aqueous humor.

Bakry points out that the serious sequels of vitreous loss in the anterior operation are easily avoided by the posterior; and also that there is no need of iridectomy, or danger of post-operative astigmatism. He finds the posterior operation less painful, requiring less akinesis, fewer instruments and less time.

In his cases the incision was made in the upper, outer quadrant of the sclera. In this region it is possible to place it below the insertion of the superior rectus and in front of the externus, in front of the ora serrata. There is room here to make the most direct approach to the lens without injury to the ciliary body. Any radical departure in the technic of cataract extraction should be carefully considered before attempting it, but doubtless, cases will occur in which this procedure will be found worth trying. Edward Jackson.

## LOCAL AUTOHEMOTHERAPY FOR ANTERIOR-SEGMENT TUBERCULOSIS

The prognosis in cases of tuberculosis of the anterior segment of the eye is always gloomy. Restoration of good vision is unusual, complete loss of vision likely, and enucleation a not altogether infrequent outcome.

The therapy of this condition lacks

confidence. In the textbooks it is broadly desribed as symptomatic, with some hope in tuberculin and heliotherapy. Among the therapeutic counsels of despair have been roentgen and ultraviolet radiation and intravenous injections of guaiacol and calcium. The general condition of patients who are attacked by tuberculous iridocyclitis is usually excellent, and they almost never present severe changes in the lungs. Their general resistance to tuberculous infection must therfore be regarded as good, and special circumstances must have favored invasion of the anterior uveal tract, and particularly of the iris and ciliary body.

Schieck (Klinische Monatsblätter für Augenheilkunde, volume 90, page 1) attributes the peculiar course of tuberculosis of the anterior uvea to the fact that the tissues of this region are bathed by the aqueous humor, which lacks the immunologic qualities of the blood, and yet which is particularly adapted for spreading the infection. At the forty-ninth meeting of the German Ophthalmological Society (Leipzig, 1932) Schieck described a method of treatment of tuberculosis of the anterior segment by first evacuating the aqueous humor from the anterior chamber with a syringe and then at once replacing the aqueous with blood obtained from one of the patient's veins. He now reports on nineteen cases which were submitted to this treatment.

Fifteen of these cases were definitely regarded as tuberculous iridocyclitis. Thirteen of the fifteen had been under observation long enough to justify regarding them as cured and so far no relapse had occurred. Some allowance must be made for the fact that Schieck gave his patients at the same time a course of tuberculin, to which he attributes the supplemental benefit of controlling the original source from which tubercle bacilli had been thrown into the circulation. But it is a striking fact that patients who had had to return again and again for renewal of treatment, because the iridocyclitis flared up, were apparently put on the road to complete recovery by injection of their own blood into the anterior chamber.

Schieck's technique is as follows: The needle, carried on an empty syringe, is plunged through the temporal limbus of the cornea until the tip is visible in the anterior chamber. The syringe itself is withdrawn, leaving the needle, from which the aqueous slowly escapes. With a syringe, and a second needle, blood is withdrawn from one of the veins of the arm. The syringe is then attached to the needle which has been left in the cornea, and enough blood is injected into the empty anterior chamber to cover completely the iris and pupil. For the cornea it is advisable to use a short (0.75 cm.), slender, and very sharp needle.

The number of injections used in Schieck's cases varied from one to four, at irregular intervals to suit the development of each case, but the shortest interval being about two weeks. In the author's relatively limited experience, the procedure seemed free from danger.

In view of Meller's emphatic conclusions as to the tuberculous basis of sympathetic ophthalmia (see last month's issue of this Journal, page 247) it is of interest to note that Schieck had no success in the use of his method in two cases of sympathetic ophthalmia. He regards these two negative results as evidence that there is no connection between sympathetic ophthalmia and tuberculosis. The procedure also failed to benefit two cases of corneal tuberculosis. W. H. Crisp.

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## SPECIAL STUDY COURSES IN THE WEST

Several years ago while Dr. Edward Jackson was in the city of Los Angeles to present a course on physiological optics and refraction he called attention to the opportunity for the establishment in Los Angeles of an annual midwinter course of study similar to that given in Denver during the summer months. He pointed out that the advantage of the mild winter climate and opportunities for study would attract many specialists here for a vacation in the winter just as the temperate summer weather and well planned courses have attracted ophthalmologists and

otolaryngologists to Denver for the summer course.

A group of Los Angeles specialists, fired by this inspiration, met and organized the Research Study Club, so named because study was to be the first function of the organization, and because research was to be encouraged and financed by the organization as soon as developments had gone sufficiently far to enable it to do so.

For a couple of years the activities consisted in weekly meetings for ophthalmologists and otolaryngologists at which certain phases of the specialties were presented by those of the local profession who were most qualified to do so. During this period a fine spirit of comradeship was built up and a definite internal organization of the club took place.

It was the otolaryngological members of the club who exhibited the greater pioneering spirit, and so with Dr. Georges Portmann of Bordeaux as their European guest and leader they successfully carried out the first annual mid-winter course, limited entirely to otolaryngology, during the last two weeks of January 1932.

Because of economic conditions there was some discussion as to whether a course could be successful in 1933, but finally the decision was made to present again two weeks of lectures and clinics, not only in otolaryngology, but also in ophthalmology, and hereafter to make this an annual affair. Thus it was in January, 1933, that the idea planted by Dr. Jackson several years before, finally bore full fruit. This course exceeded the expectations of all concerned as to material, attendance, and enthusiasm.

In otolaryngology Dr. John Barnhill held classes in dissection on the cadaver which were so well received that he has agreed to repeat them next year. Dr. Joseph Beck presented his course on the histopathology of the ear, nose and throat, and Dr. Stacy Guild related the results of his studies upon the internal ear. In addition to these main courses numerous odd lectures and clinics were given.

In the ophthalmological division Dr. Bernard Samuels gave a series of lectures on histopathology of the eye illustrated with specimens by means of the micro-projector. Dr. Joseph McCool spoke on the ocular muscles and demonstrated the O'Connor and intracapsular cataract operations. In addition to operative and demonstration clinics, Dr. Sanford Gifford presented a series of lectures dealing mainly with therapeutics. Mr. E. B. Burchell showed beautiful specimens to demonstrate the relation between the sinuses and the orbit, discussed the bacteriology of the eye and ear, and lectured on the temporal bone. Many other clinics and lectures were given by local ophthalmologists.

The number of registrants for this course was one hundred and one, of whom thirteen came from outside the state of California. Twenty-eight members were registered from outside the city of Los Angeles.

It has been definitely decided by the executive committee of the Research Study Club that this course is now to be an annual affair, and in so far as funds permit, an attempt will be made to have one or more of the outstanding specialists of Europe as guests each year in addition to the usual guests from various parts of the United States. The graciousness of the guests of the club in asking that only their traveling expenses be paid for their participation in the course has enabled the program committees to select those teachers best fitted for the courses to be given, and still allow the organization to make all expenses at the nominal fee which is charged for the course.

On account of the fact that the large special societies usually have their meetings east of the Mississippi river it is difficult for many specialists residing in the Rocky Mountain and Pacific Coast regions to attend the sessions of these societies. These men quickly get out of contact with the leaders in their profession in this country and also lose the opportunity of meeting European guests invited to eastern meetings who do not come this far west. The time consumed in journeying from the west coast to an eastern meeting is often

greater than the duration of the meeting itself. It would therefore seem that the Denver course in the summer in the Rocky Mountain region and the Los Angeles course in the winter in the Pacific Coast region both satisfy a definite need for special medical instruction and intercourse in this western country by bringing here leading American and European ophthalmologists and otolaryngologists. In this manner the western practitioners may have the latest developments in their specialties presented to them by the greatest of teachers without too much expense or loss of time.

By this arrangement the western specialist who finds himself in need of a vacation may in the summer time select Denver, or in the winter time choose Los Angeles for his destination, and rest assured that in either place he may satisfy both his need for recreation and learning. It is certain that everything possible will be done to maintain the present high standard of these courses so that they will be a credit to him who inspired them both, Dr. Edward Jackson. M. F. Weymann.

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## PHYSIOLOGICAL STUDIES OF OPTICAL TRACTS

A remarkable piece of work by Stephen Poliak on structure of optical tracts as studied by purely anatomical methods was described in the department of Book Notices in this Journal for February, 1933 (pp. 159-160). That this is not the only method of studying these tracts is perhaps not well known by ophthalmologists. A physiologic method based on electric reactions is a newer and very important approach to the same subject. A good abstract of this appears in Adler's new "Clinical Physiology of the Eye" (p. 175). (See p. 354 this issue for book notice).

The significance of a functional study of such a structure as the optic cortex as compared to anatomical study lies in that information not available from anatomical study may be obtained as to (1) time relations of passage of impulse over different parts of pathway, fiber cells and synapses along the pathway to cortex; (2) character of response, whether single or repetitive; what elements are involved, whether inhibited or facilitated by other nervous activity; whether spontaneously active or activated only by stimulation from outside; (3) effects of drugs and anesthetics on functioning.

The physiological method has been used by S. H. Bartlay and George H. Bishop in the Department of Ophthalmology of Washington University for several years past. Some of this work is reported in the American Journal of Physiology for February. This method has the advantage of being performed in a living animal and perhaps therefore more nearly approaches the normal condition than is possible with any method of staining of dead tissue. Most of the work has been done on anesthetized rabbits though on some, only local anesthesia has been used. The stimulation of the retina by light and the measurement of conduction to the cortex was the original intention. It was found however that there were complications in the retina, where so many possibly disturbing elements occur, that it was simpler, as a beginning, to cut the optic nerve just posterior to the eyeball and stimulate, electrically, the central end.

As is well known it is possible to measure the rate of electrical conduction along the course of a nerve. It is known that this varies with the nerve fiber. In all nerves studied, including the optic, following a single stimulus there is just one wave in each fiber and this is not repeated. Strangely enough and as yet inexplicably, each stimulus of the optic nerves produces five waves, recorded from the optical cortex, of diminishing intensity, as found by Bartlay and Bishop. It has been possible to deliminate the visual cortex by the electrical response to stimulus of the optic nerves. There is a narrow line of cleavage between the parts that will respond and those that will not. It is noteworthy that the area outlined by this physiologic method compares fairly closely with that found by anatomical observations. Many points of interest have been discovered. The interpretation of some of these has thus far remained obscure.

For example there is a difference in time for conduction to the cortex over some pathways as compared to others. This naturally suggests intermediary synapses in the course of these bundles in which there is delayed response because the rate of conduction along all uninterrupted nerve fibers is the same.

Significant points brought out by Bartlay and Bishop are that the optic cortex is continuously active even when the optic nerves are not stimulated; this activity is decreased and finally stopped by anesthetics or by cutting off blood supply. Stimulation of the optic nerve increases it, causing a series of five large responses at about one-fifth second intervals that stand out above the spontaneous activity of the cortex, but appear to involve the same cells. The effect of strychnine applied to the surface of the cortex is to cause rapid repetitive responses of large size, which propagate laterally across the cortex into the nonstrychninized area. This suggests that pathways exist from cell to cell across the cortex as well as from thalamus to cortex.

The spontaneous activity of the cortex is rhythmic, but not all cells follow the same rhythm. At any instant certain of the nerve pathways from one optic nerve to cortex are nonconducting or refractory, and at successive instants other pathways are refractory, while the first have recovered, so that some pathways are always available for conducting impulses from retina to cortex. Since the cortex is continuously active without visual stimulation the act of vision must involve not simply the arrival of impulses in the cortex, but rather an alteration by the optic nerve impulses of the continuous and spontaneous activity already going on at the cortical level. Lawrence T. Post.

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## BOOK NOTICES

**Clinical physiology of the eye.** By Francis Heed Adler, M.D. 406 pages, cloth, 92 illustrations. The Macmillan Co., New York. 1933. Price $5.00.

This is an exceedingly interesting and illuminating presentation of ocular physiology. The subject is considered exhaustively in a very readable manner. For the first time the whole subject has been collected in one volume. There is a logical division into fourteen chapters with sections appropriate to each. At the end of each chapter are numerous references from the text. There is also a comprehensive alphabetical index at the end of the book.

It would be difficult to speak too highly of this volume; not only of the context but of the clear and logical manner of its presentation. Treating the subject in great detail, the author has not sacrificed readability. It is the kind of book that the reader will not want to put down. There can be no doubt that many important considerations that will be new to almost any ophthalmologist will be found in this volume. The author is to be congratulated on this contribution which he has made to ophthalmic literature.

Lawrence T. Post.

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**Der Deutschen Ophthalmologischen Gesellschaft.** In Leipsic, 1932. Edited by A. Wagenmann, Secretary. Paper 8vo, 612 pages 229 illustrations. Munich. J. F. Bergmann 1932.

This volume publishes the proceedings of the 49th meeting of the German Ophthalmological Society, formerly the Heidelberg Congress; which has been held of late years in several other German cities. It contains the 65 papers read at its five sessions, the discussions of them, and 35 demonstrations given at its demonstration session. Of its 780 members there were 190 who attended this meeting, including four of the 30 who live in America. This volume has been issued within six months after the meeting, which was held May 19 to 24, inclusive. It is an up-to-date presentation of recent advances in ophthalmology.

There are eight papers on detachment of the retina and its treatment, followed by a general discussion of the subject, in which 16 participated. Among those reading papers were Gonin, Lindner and Guist, the last two

describing operations in which they had departed from the Gonin technic. Weve, of Utrecht, described the method of using diathermy in the treatment of retinal detachment. One cannot glance at these papers without realizing that the Gonin operation has awakened a great interest in the subject, and that famous men of large experience are trying in different directions, to find measures that will greatly improve the prognosis for such detachments.

It is impossible to mention all the important subjects that claimed the attention of the meeting and brought out general discussion. J. Igersheimer reported on experimental therapy for tetany cataract; and H. K. Mueller on experimental production of cataract. There was a paper by E. Werdenberg, of Davos, on the antagonisms and parallelisms between ocular and thoracic tuberculosis, with three other papers on tuberculosis, that brought out a broad discussion. Glaucoma and related subjects of course came in for discussion, by several papers read at two of the sessions.

This Society has in many ways recovered from the adverse influence of the world war. It shows a broader interest and a greater readiness to receive new suggestions and take up investigations on new lines than it had previously manifested.

Edward Jackson.

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**Radiologic Maxims.** By Harold Swanberg, with a foreword by Henry Schmidt. 126 pages. Paper covers, price $1.50. Radiological Review Publishing Company, Quincy, Illinois, 1932.

This little booklet may be said to achieve originality in its method of presentation, but it is hardly to be recommended as a work of instruction or reference. As far as the author's personal share in it is concerned, it consists of a number of disjointed paragraphs under various heads, and between groups of such paragraphs are interpolated quotations from miscellaneous writers on cancer, radiotherapy, and roentgenotherapy. Most of the author's short paragraphs, and also most of the quotations, are devoted to stating, with much repetition, the purposes to which radiotherapy or roentgenotherapy may be applied, and little is said about technique of diagnosis or therapy. An index is included.

W. H. Crisp.

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**Augenheilkunde des praktischen Arztes,** ein Leitfaden für Aerzte und Studierende (Ophthalmology of the practical physician, an outline for physicians and students). By Dr. K. Vogelsang, Privatdozent at the University of Bonn. 121 pages, with 22 illustrations. Paper covers, price 4 marks. Urban und Schwarzenberg, Berlin and Vienna. 1933.

This insignificant little volume is amplified from some articles published by the author in Medizinische Klinik. It touches very briefly on one eye disorder after another; so briefly, that one finds difficulty in understanding what practical purpose the volume might serve, unless perhaps as a short key or reminder of things learned during undergraduate study. Among other doubtful utterances, one is surprised to find the statement that it is absolutely necessary to dissect out the sac of a chalazion as relapse will otherwise occur; the author being evidently unfamiliar with the technique of curettement. The extreme importance of differential diagnosis between iritis and glaucoma is mentioned and the subject is then dismissed in a few inadequate lines. The author allows his cataract patients to get up on the second or third day.

W. H. Crisp.

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**Bulletin de la Société Belge d'Ophtalmologie** (Bulletin of the Belgian Ophthalmological Society), no. 64. Transactions of the 64th meeting of the Society at Brussels, April 24, 1932. Paper covers, 134 pages, illustrated. Price not stated. Brussels, Imprimerie Médicale et Scientifique, 1932.

The more important papers and case reports contained in this volume of the

Bulletin are abstracted in the abstract department of the American Journal of Ophthalmology. The Bulletin contains the usual directory of members of the Belgian Society. W. H. Crisp.

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**Mirrors, Prisms and Lenses.** A textbook of geometrical optics. By James P. C. Southall. Cloth, 806 pages, 329 figures. Price $4.50. Published by the Macmillan Co., New York. 1933.

This book will be found interesting reading even to those not mathematically inclined, for throughout, the subject has been enlivened by numerous short historical items and practical notes. The work is written as an introduction to the theory of modern optical instruments and is the outgrowth of a course of lectures given by the author at Columbia University.

In the earlier chapters the book enters into a considerable amount of detail treating the more elementary portions of the subject. The mathematics has been kept as simple as possible, illustrated by the familiar geometrical diagram. At the end of each chapter is appended a number of problems. Besides being good exercise for the student, many of these problems have a special value as corollaries of more practical utility than the theorems from which they are derived.

This third edition contains two new chapters, one on the microscope considered as being more or less typical of optical instruments in general. The other new chapter treats of double refraction, the ophthalmometer, visual acuity, color sensation, binocular perception of depth and the nature of light. Ophthalmic lenses are adequately dealt with in the earlier chapters.

The reviewer does not mean to imply that this book is elementary for in fact it goes deeply into the subject. It is an excellent text or reference book for ophthalmologists in general, for it can meet the need of different tastes. Those not interested in mathematics can obtain much from the reading matter, and from this standpoint the book serves as a splendid reference work. As a text one can use it to go far into the details of modern optics.

H. Rommel Hildreth.

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## OBITUARY

### G. Oram Ring, A.M., M.D.
### 1861-1933

Dr. G. Oram Ring died at his resience in Philadelphia after a brief illness, January 17, 1933. He graduated from the Medical School of the University of Pennsylvania in 1885, and later worked in the Eye Department of the out-patient service of the University Hospital. He at once became interested in ophthalmology, and soon became Ophthalmic Surgeon to the Episcopal Hospital, an active service which he continued for over twenty-one years, until he was made Consulting Ophthalmologist to the Hospital. He was also Ophthalmologist to the Widener Home for Crippled Children, and Consulting Ophthalmologist to the American Oncologic Hospital.

Some of his most important papers were based on cases seen and operated on at the latter institution. He became a Fellow of the College of Physicians of Philadelphia in 1895, and in 1901 a member of the American Ophthalmological Society. He was a member and President of the Medical Club of Philadelphia, and early took the certificate of the American Board for Ophthalmic Examinations. He was a dignified and polished gentleman; contributing much to uphold the dignity of his profession. He has been a regular contributor to the News Items of this Journal up to the January number of the present volume. He was not a prolific writer, but his papers were gladly received by the American Ophthalmological Society, and the general medical societies of his city and state. Edward Jackson.

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## CORRESPONDENCE

### The prolonged occlusion test

"In a letter in the February number of the Journal, Abraham makes the following statement: 'The method of patching used agrees with the method described by the ardent supporters of

this test who considered the gauze patch an improvement over Marlow's opaque lens. . . . Marlow himself gave *support* (the italics are mine) to this more effective method of producing dissociation by *failure to criticise* this point in his discussion of C. S. O'Brien's paper'.

"This carries implications untrue in two particulars. In the first place that I have used a gauze patch and secondly that I support its use. I have never used a gauze patch and consequently have no experience on which to base an opinion. On general principles I do not think it desirable for reasons obvious to any intelligent and experienced ophthalmologist. In the next place I have said nothing about such a method either one way or the other. In other words, Dr. Abraham has twisted what I did *not* say into an opinion supporting what *he* considers the better method. On the other hand in my monograph on the occlusion test I have specifically stated that I have found a ground glass to be quite efficient although in some cases that it is pleasanter for the patient to have a black patch or to paste a piece of dark paper over the back of the lens. Again in a paper on the "Technique of the Occlusion Test" (A.J.O., April 1932), I stated the same thing, that, as a matter of fact, a ground glass is quite efficient and much less conspicuous than any other device.

"If Dr. Abraham had paid more careful attention to what I *have* said on the subject and not drawn a positive conclusion from a negative basis he would have avoided an untenable position. As it is, he admits coming to very important conclusions from very inadequate data. For instance, in the small number of cases he examined the period of occlusion averaged twenty-three hours. A week's occlusion at least is necessary for reliable conclusions.

"In the discussion referred to by Dr. Abraham I said, 'I doubt the value of such short tests as Dr. O'Brien describes and I fear that if these short tests do not bring the prolonged occlusion test into disrepute they will at any rate greatly lower its value'.

"The papers of Abraham and Beisbarth seem to justify this doubt.

"Further comment is unnecessary."

(Signed) F. W. Marlow.

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March 13, 1933.

Editor,
American Journal of Ophthalmology.
Dear Sir:

Because of the association of Rio Hortega's name with microglia and oligodendroglia in general, I gave Rio Hortega the credit for their discovery in the retina and optic nerve in my "Notes". Dr. Lopez Enriquez of Madrid puts me right on the subject in the following letter, translated from the Spanish:

"I have read with great pleasure your 'Notes on history of ophthalmology in Spain', published in v. 15, November 1932, of the Amer. Jour. of Ophth.

"As a Spaniard I am very much gratified with the attitude of your paper, but I take the liberty of calling your attention to the paragraph in which you say 'Rio Hortega, the discoverer of phagocytic microglia and oligodendroglia in retina and optic nerve'. Since it is a matter of actual facts of our own days, I am interested in informing you about the subject.

"My dear teacher Rio Hortega is entitled to the honor of having discovered and sagaciously interpreted the microglia and oligodendroglia in the brain and spinal cord. The discovery of the same elements in the retina and optic pathways was made by me in 1926.

"Please consider these lines in the light of a simple desire to record the fact. Yours, etc.

L. Enriques."

In the light of the above letter, a correction in the Journal is in order.

Yours very sincerely,

(Signed) M. Davidson.

# ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

## CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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### 1. GENERAL METHODS OF DIAGNOSIS

Baratta, O. **The velocity of sedimentation of the red cells in ophthalmic diseases.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 638.

The velocity of sedimentation of the erythrocytes has received much less consideration in ophthalmology than in several other branches of medicine. Baratta studied 206 eye cases of various types, at the beginning, during the course of the disease, and after recovery. In eighty-six cases the velocity was normal, in seventy-five it was accelerated and in forty-five decreased. Thus, no definite conclusions can be drawn, in any large sense, as to the value of such a test. Eugene M. Blake.

Eidenbenz, Charlotte. **The macula lutea and its surroundings in the light of hitherto recommended methods of red-free ophthalmoscopy.** Klin. M. f. Augenh., 1932, v. 89, Oct., p. 433.

This is a historical and critical discourse on the color of the macula in the different methods of examination. Red-free ophthalmoscopy may be exhaustively employed only by direct light of an arc lamp of uniform current; all other sources of light being insufficient. It is suggested that the original Zeiss lamp be improved by increased thickness of carbon and intensity of current. C. Zimmermann.

Eidenbenz, Charlotte. **Red-free or green light?** Klin. M. f. Augenh., 1932, v. 89, Oct., p. 445.

Some authors confuse red-free with green light. Red-free light contains not only green, but also yellow, blue, and violet rays, and only appears green because the red component is lacking. Therefore in red-free light a yellow, green, blue, or violet tint may be visible, but not a red tint, which must appear black; whereas in pure homogeneous green light not only red, but also yellow, blue, and violet appear black. For visibility of the macular yellow, sufficient luminosity and content of yellow rays are necessary.
C. Zimmermann.

Kalashnikov, V. P. **The diagnosis of color blindness by the methods of Kohn, Stilling, and Nagel.** Sovietskii Vestnik Opht., 1932, v. 1, pt. 7, p. 318.

The author examined the color sense of 692 railway employees, using the tables of Kohn, Stilling, and Nagel. Defects of color sense were found in sixty-nine cases (almost ten percent). The three tests were found to be supple-

mentary rather than identical; none of them should be omitted if an accurate estimation of color sense is desired. A uniformly positive result (+ + +) establishes normal color sense; a uniformly negative result (— — —) is incompatible with any occupation requiring differentiation of colors. In doubtful cases the use of Nagel's anomaloscope is recommended.

M. Beigelman.

Kreindler, A., and Brecher, I. **The chronaxia of the pathological visual system.** Graefe's Arch., 1932, v. 129, p. 250.

With the technique of Bourguignon, fifty patients suffering with various eye diseases were examined for the chronaxia. In normal eyes, the relation between the chronaxia of the cones or the center of the retina and that of the rods or the periphery of the retina was as two to one. The chronaximetric method revealed the seat of the ocular disease. If in a case of chorioretinitis a greater value was found in the first or second neuron, it was concluded that the primary focus was located in the choroid or in the retina, in the macula or in the periphery. In an optic neuritis, if the second neuron was more affected at the periphery than at the center, this showed that the disease process had begun at the periphery and was therefore apparently perimeningeal. The relation between the chronaxia and the rheobasis showed whether the neurons were totally or partially destroyed by the pathologic process.

H. D. Lamb.

Lijo Pavia, J. **Color photography of the fundus.** Rev. Oto-Neuro-Oft. 1932, v. 7, Aug., p. 330.

The author reviews the various methods advanced for photographing the human fundus including that of Guist. A. G. Wilde.

Mackay, George. **A hand campimeter for the confrontation test.** Brit. Jour. Ophth., 1932, v. 16, Dec., p. 750.

This apparatus consists of a handle plus three concentric circular rings of wire, delimiting fields of 10, 15, and 20 degrees radius when held vertically at a distance of twenty inches from the patient's face. Radiating wires holding the circular wires in position divide the fields into halves, quadrants, and octants. A looped cord placed around the neck regulates the distance from the face. D. F. Harbridge.

Matthey, Genevieve. **A standard curve of dark adaptation for clinical observations.** Graefe's Arch., 1932, v. 129, p. 275.

A special method was used in the clinical examination of dark adaptation. With this method, the adaptation intervals and intensities were determined in fifty-four normal persons and a medium or standard curve and a curve of the upper limit of scattered observations were drawn. Dark adaptation was not found to depend upon the patient's age, the amount of pigmentation in the fundus, the sex, or the blood group to which the patient belonged.

In twenty-two children with myopia, the threshold stimulus was higher than in persons with normal light sense. This supports the contention of Brückner and Franceschetti that myopic children present a specific pathologic picture which appears particularly in pigmentary changes in the macula. H. D. Lamb.

Panico, E. **Paradoxical reaction of the pupils to light.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 584.

Panico describes four cases of paradoxical reaction to light and discusses the paradoxical reaction of the pupils to accommodation. He carefully reviews the numerous causes for error in diagnosis. The paradoxical light reflex is almost always preceded by physiological miosis, which may be unilateral or bilateral and may change or disappear entirely during a course of medication. It is always associated with a grave disturbance of the central nervous system due to syphilis, and especially with lesions involving the pupillomotor pathway. The paradoxical reaction to accommodation is much rarer than that for light. It may be unilateral or bilateral and is usually associated

with paralysis of accommodation. It is caused by syphilis, intoxication from alcohol or morphine, or traumatic hysteria. Eugene M. Blake.

Trantas. **Applications of transillumination (diaphanoscopy).** Arch. d'Opht., 1932, v. 49, Dec., p. 788.

Five cases show the ease of diagnosis of empyema of the frontal sinus by transillumination. In another patient a hydatid cyst of the orbit was clearly made out not to be a solid tumor. Pus produces a dense shadow. The follicles of trachoma transmit the light, whereas those of vernal catarrh produce a shadow. In dacryocystitis or dacryoadenitis the presence or absence of pus is easily determined. M. F. Weymann.

Vajda, G. **Is the approaching test of Falta infallible?** Klin. M. f. Augenh., 1932, v. 89, Nov., p. 656.

Falta holds his index finger at a distance of 15 cm. before the patient, 1 cm. toward the side of the eye to be examined. Under normal conditions both eyes are turned inward for fixation. If one eye is blind or amblyopic it deviates more or less toward the temple, if not at once, then after approaching the finger to 3 or 4 cm. from that eye. This is the positive test. If no deviation outward can be observed, the eye cannot be very amblyopic nor blind. This is the negative test. Vajda, however, found the test negative in six patients in whom one eye had 1/10 or less vision and who had no cause for simulation. From this experience he considers Falta's negative test unreliable.
C. Zimmermann.

Zamenhof, Adam. **Ophthalmoscopy in focal and indirect light.** Graefe's Arch., 1932, v. 129, p. 149.

With his "fokalisator," a +32.00 D. convex lens placed before the slit of the simplified large ophthalmoscope of Gullstrand, the author obtains a well circumscribed lighted area in the fundus corresponding to the form of the slit. With this method of lighting, examination was made of various fundus conditions, the findings in each of which are briefly described and illustrated with a simple drawing in black and white.
H. D. Lamb.

## 2. THERAPEUTICS AND OPERATIONS

Bordás, F. **The use of percaine in ophthalmic therapy.** Arch. de Oft. Hisp.-Amer., 1932, v. 32, Nov., p. 596.

Summarizing his experiences with percaine the writer finds that it is as effective in weaker solutions (0.5 to 1.0 percent in instillation and one to two percent in injection) as other anesthetics. It does not affect the corneal epithelium, pupil, or tension, it can stand boiling, its vasodilator action is no disadvantage and is easily controlled by adrenalin, and it requires ten to thirty minutes for complete anesthesia which will last long enough for all purposes. M. Davidson.

Fernandez, F. M. **The use of tuberculin in ophthalmology.** Arch. de Oft. Hisp.-Amer., 1932, v. 32, Nov., p. 589.

Ten cases of "focal" tuberculosis in the eye (that is, without tuberculous lesion elsewhere in the body), including scleritis, interstitial keratitis, iritis, and phlyctenular keratitis, were satisfactorily treated by the writer. The initial doses should be small, and dosage individualized. Favorable effects were noted in conjunctival, corneal and scleral lesions, but no encouraging results were had in fundus lesions. Injections were well borne even as frequently as at two to three-day intervals.
M. Davidson.

Friede, Reinhard. **Mineral water cure in great loss of vitreous.** Klin. M. f. Augenh., 1932, v. 89, Nov., p. 659.

A man of thirty-three years, whose right eye had become blind after repeated attacks of uveitis, had occlusion of the pupil of his only light-perceiving (left) eye. At iridocystotomy a considerable loss of liquified vitreous (almost one-half) occurred, leaving the eye soft and the cornea flattened for five days. After twenty-four hours of forced mineral water treatment the tension increased, and corrected vision of 6/36 was obtained. C. Zimmermann.

Friedenwald, J. S. **Allergy and immunity in ocular tuberculosis.** Arch of Ophth., 1933, v. 9, Feb., pp. 165-178.

The author undertook to make an animal immune and allergic to tubercle bacilli, then to completely desensitize to tuberculin, and finally to determine whether increase or decrease in resistance to reinfection had followed loss of allergy. Complete desensitization of tuberculous guinea pigs was possible by the use of daily injection of massive doses of tuberculin. Desensitized animals showed more resistance to reinfection as tested by the mortality of the disease, the spread of the infection, or the progress of the local lesion. Thus in tuberculosis allergy is not essential for immunity; and in using tuberculin perifocal desensitization rather than perifocal allergic reactions should be striven for. Partial desensitization of guinea pigs allergic to tuberculin can be obtained by massive injection of sterile glycerine broth. M. H. Post.

Gomez Marquez, J. **Ocular tuberculosis.** Arch. de Oft. Hisp.-Amer., 1932, v. 32, Dec., p. 661.

The following classification is proposed: (1) classical localized pure tuberculous lesions, exemplified in orbital osteitis, keratitis, iridochoroiditis, and dacryocystitis; (2) functional disturbances accompanying intracranial and pulmonary tuberculosis, exemplified in sympatheticotonic disturbances in apical tuberculosis; (3) nontuberculous lesions due to allergy, such as blepharitis and phlyctenular keratoconjunctivitis; (4) central toxic disturbances in the tuberculous, such as exophthalmos in tuberculous hyperthyroidism, and toxic asthenopias. Further subdivisions of the first group are enumerated.

Suggestions are offered in regard to treatment. Tuberculin is considered dangerous because of focal reactions in the eye as well as in the lungs. Sanocrysin has been used intravenously in certain types affecting the anterior segment. M. Davidson.

Herrenschwand. **Favorable influence of removal of metabolic disturbances on eye affections.** Klin. M. f. Augenh., 1932, v. 89, Oct., p. 530.

In marked ocular symptoms of "uric acid diathesis" the author had good results with "uricedin."

C. Zimmermann.

Hosford, G. N., and McKenney, J. P. **Ointment of yellow mercuric oxide (Pagenstecher's ointment); its use and abuse.** Jour. Amer. Med. Assoc., 1933, v. 100, Jan. 7, p. 17.

The history of the salve is reviewed and Pagenstecher's recommendations for its indications and contraindications are quoted. The authors decry application of this ointment to almost every ocular disease, and would limit its use to phlyctenular keratoconjunctivitis.

George H. Stine.

Pergola, A. **Acridinic therapy of septic processes in the eye.** Lettura Oft., 1932, 9th yr., Aug., p. 387.

The author concludes that trypaflavine, known in the United States as acriflavine, is efficacious in septic processes of the eye, including hypopyon keratitis, and plastic iritis of various origins. He recommends it in adult blennorrhea, especially when complicating urethritis. The drug should be used exclusively by the intravenous method. It was administered, on alternate days, in doses of 5 c.c. of a 0.5 percent solution. F. M. Crage.

Rossi, V. **The derivatives of choline in ophthalmology.** Arch. di Ottal., 1932, v. 39, May, p. 195.

The author feels that his previous work on this subject (American Journal of Ophthalmology, volume 15, page 390) has been misquoted, and he controverts statements of Villaret, Justin-Besançon, Schiff-Wertheimer, and Gallois. H. D. Scarney.

### 3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Bichelonne. **Lenses for patients operated upon for cataract.** Bull. Soc. Belge d'Ophth., 1932, no. 64, p. 74.

For its light weight the author recommends a fused lens consisting of a

lens of crown glass with a central depression into which a flint disc is fitted and fused. He presents also a new make of nonshatterable glass bearing the trade name "aclastos." Many aphakic subjects, especially those who have had iridectomy, are sensitive to light from above. To meet this condition the author suggests the advisability of a lens tinted in the upper portion.

Jerome B. Thomas.

Gerts, Hans. **A visual acuity test.** Acta Ophth., 1932, v. 10, pt. 4, p. 564.

In the ordinary method of subjective refraction, the occluded eye may be in a state of convergence; this, being associated with accommodation which is binocular, makes accurate refraction very difficult. The author describes an apparatus which permits binocular vision of all objects except the test letters, which are visible only to the eye under examination. Ray K. Daily

Guillot, L. H. **Presbyopia due to loss of ovaries.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 92.

The writer states that total castration in women before the menopause affects the accommodation with a functional deficiency comparable to that which follows the normal menopause. Five brief case reports support his thesis. Three of the patients had been ovariotomized at the age of thirty-two, thirty-six, and forty-five years respectively, and the other two patients had suffered amenorrhea at thirty-three and forty-one years. Guillot concludes that this type of presbyopia seems to evolve independently of the cause of arrest of ovulation, whether natural, pathologic, surgical, or radiotherapeutic; and that organotherapy may perform as important a part as reading glasses in the relief of these patients.

Jerome B. Thomas.

Lodge, Oliver. **Modern theories on the nature of light.** Trans. Ophth. Soc. United Kingdom, 1930, v. 50, pp. 432-447.

The author discusses the prevailing conception of the nature of light. It appears to be both corpuscular and undulatory; consists of quanta and consists of waves. The retina must contain a substance from which an electron can be ejected. Light lower than red will excite no vision, but when the threshold for red is reached an electron is ejected, the nerves are stimulated, and we have a sensation of red. Another substance in the retina must respond to the frequency characteristic of green, and a third of the blue end of the spectrum. The light is then complete or white, and beyond this no further impression is made on the eye.

Harold F. Whalman.

Ponthus, P. **A new application of paradoxical vision: a study of astigmatism by the "staircase phenomenon of Dr. Chanoz" in colored light.** Arch. d'Opht., 1932, v. 49, Nov., p. 717.

The phenomenon of paradoxical vision as described by Pech is discussed with diagrams to explain the difference in the focal point of monochromatic red and blue light. By replacing the test letters with black concentric circles 2.5 mm. wide with a rotatable black pointer of the same width in the boxes illuminated by the nonochromatic red and blue light, one is able to measure accurately and correctly the spherical and astigmatic errors of an eye by the staircase phenomenon described in a previous article. (See American Journal of Ophthalmology, volume 16, page 167.) If simple myopia is present, the black circles on the red background are seen more distinctly than those on the blue, and correction is made until both appear equally distinct. In astigmatism the staircase phenomenon is produced by rotating the pointer. If the astigmatism is myopic this phenomenon is most marked in the blue circle when the pointer forms an angle of 45° with the axis of astigmatism.

M. F. Weymann.

Shaad, D. J. **Dark adaptation in the albinotic eye.** Arch of Ophth., 1933, v. 9, Feb., pp. 179-190.

Visual purple is produced in the eyes of albinos, as well as in the normally pigmented. Dark adaptation curves

for albino eyes are essentially similar to those for the normally pigmented. Adaptation is slower in the albino at first, but becomes more rapid than the normal after ten minutes of dark adaptation, and up to the end of the thirty-minute test. M. H. Post.

Strebel, J. **The asymmetry law of the anterior scleral segment and its practical and theoretical importance for ordering contact glasses.** Klin. M. f. Augenh., 1932, Nov., p. 633.

Asymmetries of the anterior segment of the sclera are directly proportional to the functional activity of the recti muscles and indirectly to the resistance of the sclera. They are most intense at the insertion of the internal rectus. Spherical curvatures are about thirty-three percent, asymmetrical sixty-seven percent. Strebel describes his method of measuring these. C. Zimmermann.

Vita, A. **Modifications of size and form of subjective ocular space produced by glasses.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 663.

This is a long and highly technical article on physiologic optics and does not lend itself to abstracting.
Eugene M. Blake.

4. OCULAR MOVEMENTS

Inhasz-Schäffer, Alexander. **A case of congenital isolated unilateral paralysis of the third nerve.** Klin. M. f. Augenh., 1932, v. 89, Nov., p. 629. (Ill.)

A farmer aged eighteen years presented congenital, isolated, complete paralysis of the right third nerve with secondary contracture of the right externus. Discussion of all possibilities leads to the assumption of a lesion of the nucleus of the oculomotor nerve, a congenital nuclear aplasia. This is the first description of its kind. At the squint operation the paralyzed internal rectus muscle was found well developed. C. Zimmermann.

Mott, W. C. **Muscle recession with tendon stump and Tenon's capsule fixation.** Arch. of Ophth., 1932, v. 8, Dec., pp. 858-863.

In this paper the author reports a method of recession of the rectus muscle in which, after sectioning the tendon, the muscle is tied loosely to the stump, but firmly to Tenon's capsule at either side, this latter procedure spreading the muscle and holding it snugly in apposition with the sclera. The technique is recommended as being safe, easy of execution, and effective. M. H. Post.

Ohm, J. **Nystagmus and nystagmography in the diagnosis of intracranial lesions.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 184-220.

Ohm discusses the nystagmus noted in intracranial lesions associated with field defects. In addition to that described by Barany, in which there is no nystagmus toward the blind side, Ohm describes a type in which nystagmus is noted to both sides and often with greater frequency and smaller amplitude toward the blind side. He emphasizes especially that not only chiasm and visual tract hemianopsias but also primary disease of the visual cortex belong to the Ohm type. In addition, isolated diseases of the sensory optic radiation are classed with this group. Only where the lesion also involves the motor optic radiation is the Barany type present.
Frederick C. Cordes.

Perwög, Mathilde. **Tenotomy of both internal recti in one sitting in convergent strabismus.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 239.

At the Innsbruck Clinic during the past thirteen years, in forty patients with marked convergent strabismus and hyperfunction of the internal recti the operation was performed bilaterally in one session. In twenty others, one eye was operated upon at a time. A loose suture was placed so that it could be tied later in cases where divergence developed. But tying these sutures before the end of the second day or after the fifth or sixth is not advocated. In eighty percent of the patients a perfect cosmetic and functional result was achieved by bilateral tenotomy. In fifteen percent more an advancement of one external rectus had to be added to get the same end result. The effect of the operation

is considered as functionally adequate if the movement of the eyeballs is full in all directions. Stereoscopic vision resulted twice and binocular fusion ten times. In five patients the check suture was tied and prevented divergence. In two patients the eyes became divergent; in one of them only five degrees, which was cosmetically and functionally satisfactory. In the other twelve degrees of divergence had developed when the patient was seen fifteen months later, but was easily corrected by advancement of one internal rectus. The operation is advocated only after most careful study of the muscle functions.

F. Herbert Haessler.

## 5. CONJUNCTIVA

Alvaro, M. E. **Pterygium in Saõ Paulo: statistical data.** Rev. de Ophth. de Saõ Paulo, 1932, v. 2, Dec., pp. 107-110.

Forty-nine cases of pterygium were encountered in 4,355 patients in the course of seven and a half years. Thirty-three were in men and sixteen in women. In twelve patients, all men, the condition was bilateral. Three patients were less than twenty years old, twenty-four between twenty and thirty-five years, ten between thirty-five and fifty years, and twelve over fifty years. The author always employs complete extirpation, and has seen no relapse.

W. H. Crisp.

Baratta, O. **Contribution to the study of keratoconjunctivitis secondary to lupus of the nose.** Lettura Oft., 1932, 9th yr., Sept., p. 436.

The author reports a case of keratoconjunctival tuberculosis secondary to lupus of the nose, in a girl aged eighteen years. The lupus was of slow progress and had been present since the age of eight years. Within five months there was destruction of the cornea, complete loss of sight, and atrophy of the bulb. Microscopic examination of the diseased tissue showed typical tubercles. F. M. Crage.

Bartels, Martin. **Fixation plates in transplantation for symblepharon.** Zeit. f. Augenh., 1932, v. 79, Nov., p. 29.

To hold buccal mucosa or Thiersch grafts in place after implantation for symblepharon the author uses glass shells which are retained by silk sutures through the lid.

F. Herbert Haessler.

Berberov, P. G., and Alexeev, G. M. **Noguchi's bacterium granulosis in the etiology of trachoma.** Sovietskii Vestnik Opht., 1932, v. 1, pts. 8-9, p. 368.

From the conjunctiva of patients with untreated trachoma a gram-negative bacterium, morphologically and culturally identical with Noguchi's Bacterium granulosis, was isolated on a semisolid Leptospira medium. A culture of this bacterium in its third generation was used for inoculation of two permanently blind children. Subconjunctival injections, as well as instillations into the conjunctival sac, at times after scarifying its surface, were resorted to. Observation for a period of forty-five to fifty days revealed no changes in the conjunctiva except a transient reaction (congestion, edema, some discharge) immediately following the inoculation. Nine months after the experiment the children were reëxamined, and the conjunctiva was found to be entirely normal. M. Beigelman.

Delanoë. **Considerations on the pathogenesis of trachoma.** Rev. Internat. du Trachome, 1932, v. 9, Oct., pp. 179-184.

The author compares the trachoma granulation with that of tuberculosis. Among similarities she lists the anatomopathologic picture, the dimensions of the primitive elements, their mode of evolution, the difficulties associated with successful treatment of the respective diseases, and the fact that certain medications have favorable action in each. She cites her own experiments to show that chaulmoogra oil and B.C.G. vaccine have a marked favorable action in trachoma. She concludes that there is a close relationship between trachoma and the diseases of acid-fast bacillus etiology. Phillips Thygeson.

Dyban, P. A. **On the cytology of the conjunctiva in trachoma.** Sovietskii Vestnik Opht., 1932, v. 1, pts. 8-9, p. 368.

In sixty-five cases of trachoma, smears from the contents of the follicular formations in the conjunctiva were subjected to cytologic study. The prevalent types of cell were small and medium-size lymphocytes, and then lymphoblasts. Dyban does not consider trachoma as a hyperplasia of the lymphoid tissue. The histopathology reveals changes characteristic of a proliferative inflammatory process. Smears from adenoid vegetations revealed a cytologic picture identical with that of trachoma follicles. M. Beigelman.

Folk, M. L., and Taube, E. L. **Vaccinia of the eyelids and conjunctiva.** Amer. Jour. Ophth., 1933, v. 16, Jan., pp. 36-39.

Howard, H. J. **The diagnosis of trachoma.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 132-140.

Kanyo, B., and Rötth, A. **Contribution to knowledge of the rôle of bacterium granulosis in pathology.** Graefe's Arch., 1932, v. 129, p. 97.

The authors isolated Bacterium granulosis in pure culture in two out of fifteen cases of trachoma and in three out of six cases of folliculosis. The freshly isolated strains exhibited the same peculiarities as three original Noguchi strains received from the Rockefeller Institute: These changes had retrogressed within from six to eight weeks. Spontaneous folliculosis in dogs and rabbits is frequently observed; in four out of nine monkeys in the zoo at Budapest, follicles were found in the conjunctiva.

H. D. Lamb.

Lumbroso, U. **Gonorrheal conjunctivitis of the new-born in cesarean section.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 633.

Lumbroso records a second case of gonorrheal conjunctivitis in a child born by cesarean section. Silver nitrate had been used prophylactically, but infection of the eyes was apparent on the second day. The author urges Credé's procedure in all children born by section. Eugene M. Blake.

Motto, M. P., and Dunnavan, F. L. **Hemangioma of the conjunctiva.** Amer. Jour. Ophth., 1933, Jan., v. 16, pp. 15-18.

Nagy, Maria. **Inclusions in trachoma and other diseases of the conjuntiva.** Klin. M. f. Augenh., 1932, v. 89, Oct., p. 499.

Investigations on 159 patients of the eye clinics at Vienna and Szeged and on six guinea pigs showed that inclusion bodies could not be found in other affections of the conjunctiva with follicles and papillary hypertrophy than trachoma and inclusion blennorrhea. Inclusions were found in one hundred percent of cases of initial trachoma and inclusion blennorrhea, and in forty-six percent of cases of chronic trachoma. Copper sulphate and silver nitrate did not eliminate the inclusions, and after mechanical treatment with sublimate or abrasion there was no subsidence, but at least temporary increase. The inclusions are also seen in patients without clinical symptoms, and if the conjunctiva does not become free from inclusions during remissions, a relapse may always be expected.

C. Zimmermann.

Pagès. **An inquiry into the treatment of trachoma by chaulmoogra oil.** Rev. Internat. du Trachome, 1932, Oct., v. 9, pp. 167-173.

Pagès concludes that chaulmoogra oil is not a specific for the disease and that it is often ineffective as a therapeutic agent. He suggests that experiments be performed to determine the efficacy of this substance as a prophylactic against trachoma.

Phillips Thygeson.

Pillat, A. **Production of pigment in the conjunctiva in night blindness, prexerosis, xerosis, and keratomalacia of adults.** Arch. of Ophth., 1933, v. 9, Jan., pp. 25-47.

Pigmentation occurs, in the order named, in the lower fornix, the plica, the conjunctiva of the lower half of the bulb, the lower lid, the upper half of the bulb, and finally the upper fornix and upper lid; the intensity also decreasing

in the tissues in the order named. The amount of pigmentation depends upon the length of time during which the diet has been deficient in vitamin A and the amount of that deficiency. It arises from dendritic cells or melanoblasts which originate in the basal cell layer, or the next higher layer of the conjunctiva, and from the ordinary endothelial cells, especially from the middle layers. In this latter type the pigment forms epithelial caps at the distal pole of the nucleus. As the disease clears up, due to administration of cod-liver oil, this pigmentation is the last symptom to disappear. Apparently the pigment is never absorbed from the cells, but only disappears as the cells containing it are exfoliated. (Microscopic plates, several in color.) M. H. Post.

Prins, C. W. **Leukoplakia of the conjunctiva.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 307-317.

Prins reports a case of leukoplakia of the conjunctiva in a sixty-year-old man. Examination revealed a small white superficial spot on the cornea, with another larger spot on the conjunctiva near the limbus. Upon everting the lids, the retrotarsal fold was thickened and congested, with gray-white "exudate" covering the temporal half. In the folds, there was a similar gray-white, somewhat crumbly secretion. The condition was treated with radium needles, which cured the leukoplakia. But because of scarring and complications following radiation the vision was reduced to 1/60. Frederick C. Cordes.

Puscariu, E. **Bacterium granulosis of Noguchi and the etiology of trachoma.** Ann. di Ottal., 1932, v. 60, June, p. 393.

Seventy cases were studied in Rumania, where trachoma is exceedingly prevalent. Every care was exercised to avoid saprophytic infection. The results were wholly negative. For the most part only those of staphylococci and more rarely streptococci, pneumococci, and the diplobacillus of Weeks were isolated. In only eight cases were small bacilli morphologically resembling bacterium granulosis isolated—five gram-positive and three negative—but these were not obtained in a pure state and could not be reproduced. (Bibliography.) Park Lewis.

Rezende, Cyro de. **Frequency of ocular phylctenules according to age and sex.** Rev. de Ophth. de Saõ Paulo, 1932, v. 2, Dec., pp. 103-106.

Up to the age of ten years, sixty-eight percent of the patients were female; above ten and under sixteen years, seventy percent; and above sixteen and under forty-five years, sixty-six percent. W. H. Crisp.

Rossi, G. **The nuclear inversion of Velez in the relation between trachoma and tuberculosis.** Arch. di Ottal, 1932, v. 39, Sept.-Oct., p. 439.

A greater number of bilobed leucocytes as contrasted to the number of trilobed leucocytes is considered by Velez as a specific test for all tuberculous infections even in atypical forms, a negative test permitting one to exclude tuberculous infection without reservation. The author examined the leucocytes in trachoma cases of ambulatory types in the Modena clinic. He always found the sign negative, and concludes that there is no relationship between tuberculosis and trachoma. H. D. Scarney.

Sallmann, L. **Eye changes in human chryosis after treatment with sancrysin.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 208.

In a patient treated with a gold salt preparation for a lung lesion the exposed parts of skin, the lips, and the exposed portions of the conjunctiva were discolored a slaty gray. With the corneal microscope the conjunctival stain was seen to consist of innumerable blue-gray punctate precipitates. The heavy metals are stored in the reticuloendothelial cells. They are easily reduced, and light doubtless plays an important part in deposition of the pigment. F. Herbert Haessler.

Stiefbold, Ernst. **A rare bacterial finding in the secretion of the meibomian glands in meibomian conjunctivitis.** Klin. M. f. Augenh., 1932, v. 89, November, p. 643. (Ill.)

A girl, aged twenty-one years, who elsewhere had for three years been

treated for a conjunctival affection, complained of a feeling as of a foreign body and discharge from both eyes. The mouths of the meibomian glands were widened and a compact yellowish secretion could be expressed. It contained a plump bacillus with rounded ends and central vacuoles, approaching the shape of a coccus, gram-negative, forming mucous colonies on bouillon, and pathogenic for mice.

C. Zimmermann.

Tiong, J. O. **Comparative treatment of trachoma with acetic acid and chaulmoogra oil.** Jour. Philippine Islands Med. Assoc., 1932, v. 12, Oct., p. 502.

In sixty-one cases of follicular trachoma chaulmoogra oil was used in the right eye and a twenty-five percent solution of acetic acid in the left. The technique for the chaulmoogra oil was as follows. Under cocaine, a small hypodermic needle was used to prick the granules one by one. The conjunctiva was then rubbed with a cotton applicator soaked in the oil until the broken granules were leveled flat with the surface of the conjunctiva. Both lids were treated in the same manner. The treatment was repeated in one week if necessary. For the acetic acid, under cocaine each individual granule was pricked with a hypodermic needle which had been dipped in the acetic acid solution each time a granule was pricked. Ice compresses were applied for twenty-four hours. After a week, any remaining granules were treated in the same manner. Grouping mild and severe cases together, thirty-eight recovered and twenty-three were improved. Some cases relapsed. Of the two methods the acetic acid produced more untoward effects.

M. E. Marcove.

Trapesontzewa, C. **Researches on Bacterium granulosis (Noguchi).** Rev. Internat. du Trachome, 1932, Oct., v. 9, pp. 173-179.

The author has been unable to isolate Bacterium granulosis from cases of trachoma in Russia. She finds the minute bacillus isolated by Stepanowa and Azarowa and considered by them as Bacterium granulosis to show distinct morphological, biological, and serological differences from Noguchi's bacterium. In a study of four American strains of Bacterium granulosis, she finds that the microorganism is gram labile; the short forms are more often gram-negative, the longer forms gram-positive. No one of the strains was agglutinated by sera from cases of trachoma. The author concludes that sufficient evidence has not been made available to warrant the acceptance of Bacterium granulosis as the etiologic agent of trachoma. Phillips Thygeson.

## 6. CORNEA AND SCLERA

Amias, V. **Disciform keratitis in industrial accidents.** Arch. de Oft. Hisp.-Amer., 1932, v. 32, Nov., p. 640.

Having had opportunity to observe with the slitlamp the evolution of a case of traumatic disciform keratitis from its beginning as a corneal erosion, the writer calls attention to its special characteristics: painlessness and normal corneal sensitiveness for a considerable period, little pericorneal injection, deep well circumscribed infiltration, swelling of cornea anteriorly as well as posteriorly, with irregular and lusterless surface epithelium, folds of Descemet's membrane, absence of deep vessels, and presence of a few heavy vessels from the conjunctiva on the surface of the permanent opacity. While well outlined, the infiltration, as seen with the slitlamp, extends into the surrounding stroma by digitations. This type should be distinguished from leucoma following infection with leucocytic infiltration and from traumatic activation of hereditary lues in the form of disc-shaped interstitial keratitis.

M. Davidson.

Baratta, O. **Contribution to the study of keratoconjunctivitis secondary to lupus of the nose.** Lettura Oft., 1932, 9th yr., Sept., p. 436. (See Section 5, Conjunctiva.)

Busacca, Archimede. **The connective tissue of trachomatous pannus.** Klin. M. f. Augenh., 1932, v. 89, Oct., p. 477. (Ill.)

Busacca describes his observations of small excised pieces of pannus crassus after silver impregnation. No Bowman's membrane was left. In the areas of greatest development of the pannus with new-formed vessels and cell infiltrations a dense fibrillary network was in relation with a vascular wall. Where cell infiltration was slight, corneal lamellae occurred in two aspects: (1) in parallel stripes at the surface of the cornea, or in a network enclosing small interstices with small heaps of cells. In the corneal follicles were scanty remnants of connective tissue representing destroyed corneal lamellae. C. Zimmermann.

Courey, T. L. de. **Interstitial keratitis and the Workmen's Compensation Act.** Trans. Ophth. Soc. United Kingdom, 1930, v. 50, pp. 556-564. (See Section 18, Hygiene, sociology, education, and history.)

Davids, H. **Episcleral tuberculoma.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 293-305.

Davids reports an episcleral tuberculoma in a woman of thirty-five years. It was a slow-growing, split-pea-shaped indolent mass in the episcleral tissue. In removal of the tumor, it was found to be attached to sclera but not to conjunctiva. Recovery was uneventful. (Photomicrographs.)

Frederick C. Cordes.

Gasteiger, H. **On lines of cleavage in keratoconus.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 234.

Aside from the hemosiderin ring which is probably visible in all cases of keratoconus if an arc lamp is used, the slitlamp reveals rents and clefts which lie at various levels of the cornea. The author observed an eye in which these lines were present in an entirely different arrangement. They occupied the deeper layers of the stroma and were strikingly arranged in whorls which converged to the apex of the cone.

F. Herbert Haessler.

Katz, Dewey. **Dystrophia adiposa corneae.** Arch. of Ophth., 1933, v. 9, Jan., pp. 78-101.

Eight cases of this syndrome are reviewed, and a number of others closely similar are given in abstract. The authors conclude that impairment in the normal physiological processes of the corneal cells, producing pyknosis and vacuolization, constitutes the underlying factor. Neutral fat is deposited in excess in the tissues. There is also liberation of "invisible fat," partly from the blood stream. In the author's case, numerous histiocytes were found, especially about the vessels, though also scattered between and within the lamellae of the cornea. Frozen sections stained with hematoxylin and scarlet red showed a diffuse, extremely fine granular fatty deposition in the epithelium and Bowman's membrane; also in the degenerated pannus and scattered irregularly, extracellular, throughout the corneal stroma. The neutral fat was largely intracellular, in the deeper layers of the corneal stroma.

M. H. Post.

Lewis, Maita. **Circumscribed areas of calcification and necrosis in the sclera.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 180.

Because of the recent statement of Klien-Moncreiff that the condition is very rare, the author has been studying the microscopical preparations of calcified sclera in the collection of the first Vienna eye clinic. The first two eyes resembled those reported by Klien-Moncreiff in that the deposits were circumscribed and occurred in blind eyes. They differed in that the eyes studied by the author came from young individuals and the calcification involved the inner scleral layers. In a third eye calcification took place in lesions caused by necrosis of a neoplasm. In a fourth a sarcoma was complicated by uveitis, hemorrhage, and retinal detachment.

F. Herbert Haessler.

Marbaix. **A case of edema of the cornea with probable detachment of the endothelium.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 117.

In 1922 and 1929, Aubineau reported seven cases of edema of the cornea characterized by central location, regular daily variability, and the coëxistence of

a hypercholesterinemia; and cured by the Chauffart treatment. Marbaix reports one case, a young woman of twenty-eight years, presenting the symptom complex with cholesterinemia of 2.05 gm. per liter of serum. Chauffart's treatment had no effect on the edema. Jerome B. Thomas.

Moncreiff, B. K. **An atypical pigment line of the cornea.** Arch. of Ophth., 1932, v. 8, Dec., pp. 847-851.

This paper pleads for histologic study supplementing biomicroscopic examination, and reports a case in which both methods of study were used. At twenty-two years of age the right eye received a penetrating wound; operation for relief of pain following two days later. After seven years the vision failed rapidly, and for the two years previous to this report the eye had been totally blind. During the last year there had been increasing bulging of the upper part of the eyeball, displacing the upper half of the cornea forward. A shallow sulcus extended from ten to four o'clock across the cornea, accompanied by a line of yellowish-brown pigment. Feathery opacities in the corneal stroma were found to be the counterpart of the normal lamellae. Histologically the pigmentation was far more extensive than as seen clinically. It was blood pigment in solution, gaining access to the cornea through a dehiscence in Bowman's membrane. These latter findings suggest an interesting parallel between the condition here noted and the well known Fleischer rings and the pigment line of Staehli, both associated with tears in Bowman's membrane.

W. H. Post.

Pillat, A. **Mummification of the corneal epithelium in avitaminosis A.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 200.

In a patient afflicted with xerosis from avitaminosis A, the usual Bitot spots (deposit which is easily wiped off leaving dry spots to which tears do not adhere) were absent. Instead there appeared in the cornea a large opaque area, the substance of which dropped off into the conjunctival sac at the time of treatment. Histological sections showed it to consist of dehydrated corneal cells with retention and condensation of the cell membrane and pigment in the protoplasmic remains.

F. Herbert Haessler.

Raverdino, E. **Fibroma of the sclera.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 602.

The patient reported upon by Raverdino was a male aged fifty-two years who presented a hard, plexiform fibroma of the left sclera. It was not congenital but had been growing for ten years without inflammatory reaction. It recurred twice after removal but not at the original site. The tumor was composed of bundles of dense connective tissue, was noncapsulated, comparatively avascular, and without foci of inflammation or degeneration. The author gives a good review of the literature and illustrates the article with four photographs and one colored plate.

Eugene M. Blake.

Sala, G. **Ocular malformations of hereditary and familial type.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 622.

In two brothers and the son of one of them Sala reports three cases of peculiar congenital opacity of the cornea, resembling somewhat a gerontoxon. Each case also presented aniridia and opacities of the crystalline lens. The grandfather and brother, who were not examined, suffered from what was apparently the same affection. No females in the family were affected. There were no other diseases or malformations. The condition is therefore of a dominant type, transmitted to the males by males. Eugene M. Blake.

Schneider, Rudolph. **Corneal curvature inverse of keratoconus, and remarks on the form problems of the eyeball.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 265.

An acquired anomaly of the cornea in which the curvature is least at the apex and gradually increases toward the periphery has been reported three times.

The condition is not related to keratoconus. The author describes two new cases of this "typus inversus corneae." The cornea is thinnest at the apex. He believes that the mechanical balance of internal pressure and elasticity of the wall explains neither keratoconus nor typus inversus; but he postulates speculatively bands of tension surrounding the eye meridionally and equatorially and varying in balance in such a way as to bring about keratoconus, staphyloma posticum, typus inversus, and hypermetropia. F. Herbert Haessler.

Seefelder, R. **Increase of intraocular tension after discission of after cataract, with remarks on marginal corneal ulcers appearing after ocular operations.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 212.

After discission there is frequently a rise of intraocular tension which is of no practical importance. But occasionally it takes the form of an acute glaucoma. This possibly arises when the fluids from the posterior segment of the eyeball are blocked by the vitreous which has prolapsed through the pupil. When a very resistant vitreous becomes incarcerated iris bombé may result. In one patient marginal corneal ulcers formed after nearly every ocular operation. F. Herbert Haessler.

### 7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Bendinelli, C. **Contribution to the study of tuberculous miliary retino-choroiditis of the discrete type.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 655.

Bendinelli points out that sometimes miliary tuberculous retino-choroiditis is confused with the disseminate type, though in reality there is a difference. The miliary form affects the posterior pole of the eye while the periphery of the retina is the site of predilection of the disseminate type. The miliary form appears in small foci raised toward the vitreous, and their white, yellow, or reddish borders are indistinct and rarely pigmented, while the disseminate nodules possess clear-cut borders and more or less pigment. Eugene M. Blake.

Meller, J. **Bacillemia (tuberculous) and sympathetic ophthalmia.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 110.

Meller reports in detail his findings in two patients with injured eyes. In one, histologic studies revealed a very severe sympathizing uveitis, tuberculous bacillemia, and severe sympathetic inflammation in the second eye, which healed in the course of treatment with tebeprotein. In the course of the inflammation a central scotoma appeared, doubtless a result of injury to the retina or the papillomacular bundle of the optic nerve by the toxins which leave the anterior uvea by way of a posterior route of egress. The eye of the second patient was enucleated on the thirteenth day after severe laceration. In contrast to all other tissues of the eye, which were normal apart from the results of direct mechanical injury, the choroid was involved in an intense inflammation characterized by infiltration with lymphocytes and epithelioid cells. The histologic picture is similar to one described by Fuchs in his second paper on sympathetic ophthalmia. Blood culture and culture of the ocular tissues yielded tubercle bacilli. The second eye had not become involved.

F. Herbert Haessler.

Meller, J. **Demonstration by tissue culture that sympathetic ophthalmia is a true bacillary (tuberculous) infection.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 95.

See editorial, American Journal of Ophthalmology, 1933, v. 16, March, p. 247.

Meller, J. **On the pathologic histology of spontaneous disseminated choroiditis.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 128.

Meller presents in utmost detail the clinical as well as pathologic findings in both eyes of a patient who died of peritonitis secondary to appendicitis during the course of a disseminated choroiditis. Fresh and healed lesions were made accessible to critical study. Though usually choroiditic lesions are diagnosed with the ophthalmoscope because of pigment irregularities, local

edema of the retina, grey, yellowish, or red spots, yet when a lesion involves the outermost layer of the choroid it may occasionally escape detection. However, it usually causes at least some subjective symptoms, such as flickering scotomata. A central scotoma from a choroidal lesion may be diagnosed as retrobulbar neuritis.

The infiltrative changes are so extremely chronic that they may be observed for weeks and months without visible change. Histologic study shows that even lesions which have led to destruction of the pigment epithelium and the retina may heal without leaving a trace in the choroid. The end stage of a severe choroidal infiltration may be a permanent connective tissue scar, the epithelioid cells being transformed back into fibroblasts, the cells from which they take their origin.

F. Herbert Haessler.

Sondermann, R. **The development of Müller's ciliary muscle.** Graefe's Arch., 1932, v. 129, p. 238.

Connected with the major arterial circle of the iris, and in association with the development of the ciliary processes, is formed an extensive circular network of vessels; the blood from this network being drained by a similar vein, also running circularly, the venous circle of the iris. After the major development of the ciliary processes in the last fetal months is completed, the greater part of the circular system of vessels including the venous circle becomes obliterated. The circularly arranged bundles of Müller's muscle develop from the endothelium and the associated adventitial cells of these obliterated vessels.

H. D. Lamb.

Szekely, Josef. **Tuberculosis as etiology of Fuchs' type of heterochromia.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 272.

The author presents an introductory review and reports four cases of heterochromia in which he believes the evidence for tuberculous etiology is established with a fair degree of clinical probability. Positive lung findings, reaction to tebeprotein, and in one instance a preceding bilateral choroiditis are the chief evidence.

F. Herbert Haessler.

Urbanek, Joseph. **The question of origin and etiology of periodically recurrent hypopyon uveitis.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 145.

The right eye had acute iritis and became totally blind in a few weeks. The left eye became involved about eight weeks after enucleation of the right, and after oral sepsis had been eliminated. The initial lesion in the left eye was a central chorioretinitis which healed completely under treatment with tebeprotein. Later an anterior choroiditis developed and was followed by cyclitis and iritis, which recurred a number of times with the formation of hypopyon. Three blood cultures in two and one-half years were all positive for tubercle bacilli.

F. Herbert Haessler.

Vannas. M. **A study of the influence of miotics and mydriatics on eyes with aniridia.** Acta Ophth., 1932, v. 10, pt. 4, p. 288.

In the right eye of two rabbits aniridia was produced by repeated iridectomy. The first iridectomy resulted in a considerable fall in tension, which was practically unaltered by the subsequent iridectomies. The fall in tension produced by miotics was more pronounced in the aniridic eye than in the control eye. A slight rise of tension due to homatropin and atropin was also demonstrated in the aniridic eye. The conclusions are that a mobile pupil and iris are not essential to the action of miotics, nor perhaps to that of mydriatics.

Ray K. Daily.

Woods, A. C., and Little, M. F. **Uveal pigment: hypersensitivity and therapeusis.** Arch of Ophth., 1933, v. 9, Feb., pp. 200-226.

The authors report further investigation concerning hypersensitivity to uveal pigment in sympathetic ophthalmia, and its possible bearing upon Elschnig's allergic theory. One hundred and fifty patients were divided into nine groups. When positive pig-

ment tests were obtained after penetrating wound of the eye, the outcome of the case proved most unsatisfactory. Thirty-two cases showed positive tests, eighteen in sympathetic ophthalmia, five in low-grade delayed postoperative uveitis, five in penetrating wounds of the eye with steady deterioration, and one in endophthalmitis phacoanaphylactica. Normal recovery occurred in only three, two doubtfully positive, one strongly positive. Ten having delayed nonpurulent chronic and recurrent uveitis, following injury or operation on the affected eye, developed definite allergy to pigment coincident with the occurrence of the uveitis. Some factor, in addition to hypersensitivity to pigment, appears necessary for the development of sympathetic ophthalmia.

M. H. Post.

## 8. GLAUCOMA AND OCULAR TENSION

Berg, F. **Hereditary juvenile glaucoma.** Acta Ophth., 1932, v. 10, pt. 4, p. 568.

Among sixty-one members of a family over seven generations, there were twenty-one cases of juvenile glaucoma in five generations. In four cases the diagnosis was made from the history, and seventeen were living and available for examination. The disease is chronic in type, and characterized by long prodromal periods, deep anterior chamber, and more or less extensive atrophy of the anterior layers of the iris. In the unaffected members of the family the structure of the iris was normal.

Ray K. Daily.

Casten, V., and Shaad, D. J. **Diagnostic value of tests of the light sense in early glaucoma.** Arch. of Ophth., 1933, v. 9, Jan., pp. 52-55.

The authors conclude that the light test is of insufficient reliability to be depended upon as a routine clinical test for the early stages of glaucoma.

M. H. Post.

Elliot, R. H. **Trephining.** Arch. of Ophth., 1932, v. 8, Dec., pp. 797-803.

Elliot's opinion with regard to the method of performing the operation has not changed. He feels that the cornea should be split a full millimeter, if possible, and that the trephine should be placed as far forward as the splitting will allow. It is especially important that the trephine be sharp. The best method of removing the iris is to seize it together with the disc and remove both with a single snip of the scissors. It is wiser not to go after the iris if it does not present. The author does not favor mechanical trephines.

M. H. Post.

Halbertsma, K. T. A., and Gravestein, H., Jr. **The potassium content of human aqueous humor.** Graefe's Arch., 1932, v. 129, p. 216.

Quantitative analysis of human aqueous humor obtained at operation in twenty-five cases of cataract and twenty-five cases with glaucoma showed no significant difference in the amount of potassium in the aqueous humor of glaucomatous as compared with nonglaucomatous eyes.

H. D. Lamb.

Krasso, I., and Loeffler, A. **The potassium and calcium content of the blood in glaucoma and the influence upon it of border rays.** Arch. f. Augenh., 1932, v. 106, Aug., p. 254.

Following generalized exposure of the skin to Bucky's border rays, Krasso found improvement in certain cases of glaucoma. In an attempt to determine the cause of this improvement, Krasso and Loeffler studied the potassium-calcium content of the blood of glaucoma patients before and after radiation. In the sixteen cases of glaucoma studied, they found the potassium content within normal limits nine times, subnormal twice, and above normal five times. The calcium content was within normal limits ten times, and above six times. Eleven of these patients were radiated, and of these two were subnormal and one above normal for potassium, while four showed normal and seven increased calcium content. This variation of findings the authors believe bears out the contention of the internists that glaucoma patients have a hyperirritable vegetative nervous system.

Frederick C. Cordes.

Krasso, I., and Strisower, R. **The influence of pressure on the carotid on ocular tension and blood pressure.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 173.

Pressure on the neck at the bifurcation of the carotid artery causes reflex lowering of blood pressure and this is accompanied by lowering of intraocular tension. Variations in blood pressure of short duration are accompanied to a great extent by changes in intraocular tension in the same direction. From a large ambulatory clinic the authors were able to select thirty-five suitable patients who had neither general arterial hypertension nor glaucoma, and in eighteen of these it was possible repeatedly to measure the tension during the carotid pressure test.

F. Herbert Haessler.

Sondermann, R. **The origin of intraocular pressure.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 97-105.

Werner S. **Gonioscopy in primary glaucoma.** Acta Ophth., 1932, v. 10, pt. 4, p. 429.

This is a detailed illustrated report of the gonioscopic findings of one hundred normal eyes, one hundred and nineteen eyes with primary glaucoma, and eleven apparently normal eyes of patients suffering with unilateral glaucoma. In the normal eyes the angle of the anterior chamber was free. In inflammatory glaucoma anterior peripheral synechias are usually found, while in simple glaucoma the angle is as a rule free. Anterior peripheral synechias may form prior to the development of glaucomatous symptoms. Their presence is therefore indicative of a previous attack or of a predisposition to glaucoma—usually of the inflammatory type. Their presence has but little effect on the intraocular tension or on the size of the pupil. In bilateral glaucoma the two eyes are usually alike, relative to the presence and extent of anterior synechia: such was also not rarely the case in unilateral glaucoma. The effect of miotics on anterior peripheral synechia is uncertain; the more intensive the miosis the greater is the likelihood of breaking them up. In simple glaucoma the angle remains free during maximal adrenalin mydriasis.

The result of miotic treatment does not depend on the freeing of the anterior synechia. The intraocular tension came down to normal in inflammatory glaucoma, with peripheral synechia remaining, while in some cases of simple glaucoma with the angle free the tension remained high. In simple glaucoma treated with miotics over a long period there was no increase of peripheral synechias, although the glaucomatous process was advancing. After iridectomy the angle in the colobomatous area is free but the peripheral synechias in the rest of the anterior chamber are usually undisturbed. After iridencleisis or trephining the majority of cases show extensive scleral synechias which seem to have no effect on the tension.

Ray K. Daily.

## 9. CRYSTALLINE LENS

Bichelonne. **Lenses for patients operated upon for cataract.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 74. (See Section 3, Physiologic optics, refraction, and color vision.)

Braun, R. **Primary toxic action of lens substance.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 99-144.

Braun found that the lens substance of pigs, calves, rabbits, and guinea pigs and the cataractous lens of man contained a toxic substance that would cause contraction of uterine muscle of the guinea pig. This held even though the animal had previously been sensitized to lens substance of the same or other species. Intracardial injections of this lens toxin caused varying degrees of anaphylactic reaction. Braun felt that his work proved the uselessness of Dale's method in experiments on anaphylaxis due to lens substance. In addition, it tends to disprove specificity of lens substance as claimed by experiments based on anaphylaxis. Experimental evidence does not substantiate the picture of endophthalmitis phacoanaphylactica. The postoperative reactions not due to infection may be ex-

plained as the result of direct irritation of the lens toxin.

Frederick C. Cordes.

Federici, E. **Concerning some special indications of conjunctival autoplasty in the cataract operation.** Arch. di Ottal., 1932, v. 39, Sept.-Oct., p. 417.

The author brings down the conjunctival flap to cover the corneal incision. He does not share the opinion of those who wish to adopt a conjunctival flap as a method of election in the operation of cataract, but he recognizes its value in restless, asthmatic, or very old patients, or those who the surgeon believes may develop postoperative complications. (Illustrated.)

H. D. Scarney.

Filippi-Gabardi, E. **Nontraumatic (congenital and acquired) luxation of the lens.** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 715.

The author reports five cases of spontaneous dislocation of the lens and discusses the literature and the development of the condition. Congenital luxation occurs as a teratologic manifestation of anomalous development of the crystalline lens. It is frequently associated with anomalies of the iris or ciliary body. The acquired primary or idiopathic luxation is found in eyes undamaged by ocular disease and there is probably a congenital, general, or local predisposition. The displacement is often partial. Spontaneous secondary luxation occurs as a pathological corollary in eyes affected by previous disease, especially glaucoma, myopia, choroiditis or iridocyclitis.

Eugene M. Blake.

Fischer, Franz. **A contribution to the malformations of the eye.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 158. (See Section 10, Retina and vitreous.)

Herrenschwand, F. **A metastatic fungus infection in an eye ten years after extraction of a cataract complicating heterochromia with cyclitis.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 223.

The eye had gradually lost its vision in the course of the preceding two months. It was not irritated, but the anterior chamber was filled with a mass which consisted of a network of fine brown dotted lines. The iris was everted and its surface was traversed by innumerable blood vessels. A fresh intraocular hemorrhage made the eye painful, so that it was removed. The entire anterior chamber was filled with the mycelium of a fungus of the genus trichomycetes. F. Herbert Haessler.

Kaufman, S. I. **Morgagnian cataracts and their complications, with report of a case of spontaneous rupture of the lens capsule causing secondary glaucoma.** Arch. of Ophth., 1933, v. 9, Jan., pp. 56-63.

The tension in the eye was 62 mm. when the patient was first seen by the author. Cholesterol crystals were floating in the anterior chamber, indicating rupture of the capsule. At operation the nucleus was seen lying at the bottom of the capsular sac. The slitlamp later showed a rent in the anterior capsule, the shape ruling out injury with the keratome. M. H. Post.

King, W. F. **Intracapsular extraction at the German eye clinic (Elschnig) in Prague.** Arch. of Ophth., 1933, v. 9, Feb., pp. 191-199.

This interesting statistical report does not lend itself to abstraction. The removal of the cataract is done by means of Elschnig's capsule forceps. In about seventy percent of all uncomplicated cases, the lens was removed without rupturing the capsule. The various steps of the operation are briefly enumerated, and a report of cases and their complications clearly given. The author recommends Elschnig's recently published book on intracapsular extraction. M. H. Post.

Lyster, T. C. **Management of dense secondary cataract.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 122-125.

Marsh E. J. **Lenticonus posterior: further study.** Arch. of Ophth., 1932, v. 8, Dec., pp. 804-820.

The first or type form is a transparent, hemispherical bulge set like a skull-

cap on the posterior pole of an otherwise normal lens. The second type shows opacity at the bottom of the conus, or irregularity in its form. The third type shows lenticonus with related opacities and changes in the lens substance. The fourth class is of cases of vague description and uncertain complications. The author discusses the anatomy and embryology of the lens, and the causation of lenticonus, which he thinks due to accommodative strain under special conditions. M. H. Post.

O'Brien, C. S. **Experimental cataract in vitamin G deficiency.** Arch. of Ophth., 1932, v. 8, Dec., pp. 880-887.

Vitamin G, also known as $B_2$, is the second factor in water-soluble vitamin B. Young rats deprived of it fail to gain in weight, and eventually show changes in the eyes, skin, and internal organs. Many die from gastrointestinal and genitourinary pathology. In the author's experiments, four rats almost entirely deprived of vitamin G at the age of twenty-one or twenty-two days all developed cataract by the sixty-seventh day. In a second litter similarly deprived, two developed cataract by the eighty-fourth day. In a third litter, from which vitamin G was not withdrawn until the age of forty-three days, none developed cataract previous to death, which occurred between the eighty-ninth and one hundred and twenty-seventh day. The changes in the lens conformed to no particular type; being sometimes cortical, sometimes nuclear, at other times diffuse. These lens changes were frequently accompanied by anterior interstitial keratitis, conjunctivitis, and swollen lids.
M. H. Post.

Penido Burnier. **Ectopia lentis.** Rev. de Ophth. de Saõ Paulo, 1932, v. 2, Dec., pp. 83-86.

The records of the author's institution in southern Brazil include seven cases of dislocation of the lens, seen in the course of seventeen years among 55,000 patients. The ocular condition in a girl of twelve years is beautifully illustrated stereoscopically, the other six cases were in adults between the ages of twenty-four and forty-three years. Several of the cases were successfully operated upon by removal of the crystalline lens, although retinal detachment was an occasional late complication of such operation. W. H. Crisp.

Riedel, Franz. **A contribution to the histology of detachment of the anterior capsule (fire lamella) in glass-maker's cataract.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 287.

This is a histological study of three eyeballs with so-called fire lamella. The author concludes that the condition is an expression of severe general disturbance, particularly of the lens capsule, largely caused by indirect radiant energy. The capsule splits and crumbles. The great thickness of the detached lamella is striking, as is also the thinning of the capsule as a whole even when no scaling has taken place.
F. Herbert Haessler.

Rohrschneider, W. **Morphology and origin of x-ray cataract in man.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 220-254. (See Section 16, Injuries.)

## 10. RETINA AND VITREOUS

Coppez, L. **The operative treatment of detachment of the retina and the two Vienna schools.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 64.

The author reports his impressions of a visit to the Vienna clinics of Meller and Lindner respectively and describes in detail their theories of the etiology of retinal detachment and their operative technique. The operation of Guist and Lindner is especially attractive on account of its comparative delicacy as well as its facility of dosage. It consists in multiple trepanations of the sclera at the edge of the zone of the tear, followed by chemical cauterization in each trephine orifice. Meller's method aims to obtain chorioretinal adhesions by diathermocoagulation instead of chemical action, the active electrode being placed on the carefully denuded sclera. Both schools have the same object, that of obtaining a large

surface of adhesive choroiditis. Lindner's method seems more exact and more frequently successful, Meller's more simple and elegant in application but lacking in control.

J. B. Thomas.

Ferrari, A. **The test of Aldrich and McClure and the function of the capillaries in idiopathic detachment of the retina.** Arch. di Ottal., 1932, v. 39, no. 6, June, p. 280.

The test of Aldrich and McClure is based upon the time of disappearance of a bleb produced by injection into the skin of 1/20 c.c. of a physiological salt solution in cases of idiopathic detachment of the retina. In the same type of case the author used intradermal injections of histamine to test the functional activity of the capillaries. He also used the Volhard test for renal concentration, and kept a record of the blood pressure, systolic and diastolic, and of the venous pressure.

In five cases reported as idiopathic detachment of the retina the test of Aldrich and McClure was found to be positive. In the first four cases there was an alteration of capillary function as interpreted by intradermal injection of histamine, and in the same four cases there was a rise in systolic and diastolic blood pressure. In all five cases there was a rise of venous pressure, and altered ability to concentrate urine. This is a preliminary report.

H. D. Scarney.

Fischer, Franz. **A contribution to the malformations of the eye.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 158.

In each eye of a thirteen-year-old girl a loop of vessels accompanied by a stump-like remainder of the hyaloid artery projected into the vitreous. The arrangement of tissues, clearly shown by a fundus picture and by diagrams, supports Aust's view of the origin of loops of blood vessels in the vitreous. A peculiar form of ectopia lentis was seen in one eye of a six-months-old child. The lens projected through the large irregular pupil so that it was partly in contact with the posterior corneal surface. The manifestation was not familial. The author points out that during the sixth week of embryonal life the lens equator lies in the plane of the pupil and what is normally a physiological incarceration of the lens may have been pathologically prolonged until change became impossible.

F. Herbert Haessler.

Goldstein, I., and Wexler, D. **Retinal vascular disease in a case of acute lupus erythematosus disseminatus.** Arch of Ophth., 1932, v. 8, Dec., pp. 852-857.

This case report is "an instance of unique disease affecting the large arterioles in the retina." The lesion consisted of atrophy of the vascular walls, with replacement by a material resembling hyaline connective tissue, accompanied at times by perivascular fibrosis with discrete areas of retinal atrophy. The choroid was unaffected. Secondary optic atrophy was present.

M. H. Post.

Hesse, Robert. **The anatomical bases of Hippel's disease of the retina.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 252.

Most students of Hippel's disease consider it essentially an angiomatosis with secondary glial proliferation. Meller bases his dissenting opinion, namely, that the gliosis is primary, on histological studies of an eye in which many small glial masses were found without vascular or endothelial proliferation. Hesse carefully studied an eye afflicted with the disease, and believes that the changes found were essentially the formation of a capillary angioma. He does not agree with Oguchi that Coats' and Hippel's disease are indistinguishable. Coats' disease is probably a symptom complex which may arise from various causes, one being angiomatosis.

F. Herbert Haessler.

Leplat, G. **Rectification on the subject of the structure of the vitreous humor.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 90.

In 1931 the author announced the results of his researches on the structure of the vitreous. In this brief report he states that he has completely

changed his opinion, and he adds new arguments to those of Baurmann, Duke-Elder, Redslob, and others in favor of the conception of a vitreous body completely lacking histologic structure. Jerome B. Thomas.

Lindner, K. **The use of opaque spectacles with a central hole in the treatment of retinal detachment.** Zeit. f. Augenh., 1932, v. 79, Dec., p. 191.

These are advocated to limit the movements of the eyeball, so as to prevent extension of the detachment and the formation of secondary tears. Frequently the detachment becomes flat after a few days' wear, so that the defects in the retina may be more accurately localized. In all types of operation the prognosis is better if the retina is flat at the time. Occasionally this device facilitates differential diagnosis between detachment secondary to a tear in the retina and one due to transudation or exudation. Often too a second operation for slight residual detachment may be postponed for weeks or months. F. Herbert Haessler.

McKeown, H. S. **Detachment of the retina: Guist operation and report of cases.** Arch. of Ophth., 1933, v. 9, Jan., pp. 64-77.

In this paper the author reports twelve cases operated upon by the Guist method. Six were entirely successful, three moderately so, and three failures. In the hands of a few experts ignipuncture is claimed to have given about fifty percent of cures but the percentage falls to between ten and fifteen percent in the hands of other competent ophthalmologists. In the Guist technique emphasis is placed upon a large number of trephine openings through the sclera. The treatment with potassium hydroxide should not be too conservative, but it should be realized that too much cauterization may produce so great an inflammatory reaction as to result in failure. In some cases as many as twenty-four trephine openings have been made. The entire area of detachment should be covered. The operation is slow and time-consuming.

M. H. Post.

Stein, R. **Topography and anatomy of the ora serrata and the ciliary body.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 144-184.

Stein studied sixty eyes of different axial length and refraction. He found that the distance of the ora serrata from the limbus varied according to the axial length and, to some extent, the refraction. On the temporal side, the ora serrata was usually 1 mm. more distant than on the nasal side. Variations were also noted in the ciliary body, particularly a variation in the pigment on the temporal and nasal sides. Frederick C. Cordes.

## 11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Busacca, Archimede. **Ocular incidents in malaria therapy.** Rev. de Ophth. de Saõ Paulo, 1932, v. 2, Dec., pp. 96-98.

In two patients a partial atrophy of the optic nerve was seriously aggravated during treatment with malaria. The author attributes this result to an increased sensitivity of the optic nerve, analogous to the condition spoken of as the Herxheimer reaction. As less probable he mentions meningeal reaction from the malaria, accompanied by compression of the optic nerve in its bony canal. W. H. Crisp.

Hambresin. **Complete blindness following two injections of acetylarsan.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 111.

A man of fifty-five years received two intramuscular injections, 2 c.c. each, of acetylarsan (stovarsol combined with diethylamin). The second injection was given four days after the first, and the next morning his vision was densely foggy in spite of vigorous treatment. In a few days, pallor of the discs had already set in, and complete blindness followed. The patient had albuminuria and the writer suggests that the faulty renal function may have favored the toxicity of the acetylarsan for the optic nerve.

Jerome B. Thomas.

Kuhn, H. S. **Osteitis deformans with optic nerve atrophy.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 128-131.

Saphir, O. **Changes of the optic nerve resulting from pressure of arteriosclerotic internal carotid arteries.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 110-118.

Stough, J. T. **Choking of the optic discs in diseases other than tumor of the brain.** Arch. of Ophth., 1932, v. 8, Dec., pp. 821-830.

Ten cases, five in adults and five in children, showed choking of the discs from various causes, none from brain tumor. The first and second were cases incidental to primary hypertension, with cardiac enlargement, accompanied by cerebral and renal arteriosclerosis. In the third case, primary hypertension alone was found. In the fourth, no etiological factor, other than a number of infected teeth, could be discovered. The fifth showed hemorrhagic neuroretinitis, with marked cerebral symptoms, and was diagnosed as pseudotumor.

One of the five cases in children was due to paint eaten from a paint-bucket. In the second there was thrombosis of all the dural sinuses, with a large intracerebral hemorrhage in the medial part of the right hemisphere. In this and the three final cases, no definite etiology could be determined. M. H. Post.

## 12. VISUAL TRACTS AND CENTERS

Alajmo, B. **The importance of the color fields in the diagnosis of the "chiasmal syndrome".** Rassegna Ital. d'Ottal., 1932, v. 1, Sept.-Oct., p. 577.

Alajmo reports an adenoma of the hypophysis in a twenty-seven-year-old woman who first experienced suppression of menses, accompanied by headache. A month later vomiting and diminution of vision in the left eye occurred. The weight increased. The field in the right eye was practically normal for white but for colors showed a clean-cut temporal hemianopsia and a relative central scotoma very near to the fixation point. The left optic nerve looked atrophic and no field could be determined. X-ray therapy increased vision in both eyes and the fields assumed a definite bitemporal hemianopsic form. The writer stresses the importance of testing the color fields in hypophyseal disease. Eugene M. Blake.

Baurmann, M. **The variations of intracranial pressure.** Graefe's Arch., 1932, v. 129, p. 205.

In six patients lumbar puncture was done for several successive days, three times daily. A relation of intracranial pressure to diastolic pressure measured in the central artery of the retina was not generally established. The position of the body was found to be of considerable significance as to intracranial pressure, although the effect of a change in the position of the body was apparently transient. It appeared to the author to be disadvantageous for patients with increased intracranial pressure due to tumor cerebri to lie quietly in bed; and clinically it had been repeatedly observed that they felt better when up. A similarity was also found between the curve of intracranial pressure and that of intraocular tension.
H. D. Lamb.

Bunge, E. **Bitemporal field defects.** Arch. f. Augenh., 1932, v. 106 Aug., pp. 60-98.

Bunge studied fifty cases of bitemporal field defects. He found that the vision was not always dependent upon the degree of involvement of the macular area. He doubts, however, the theory of Hirschberg and Schweiger of a double nerve supply to the macula. Bunge found that as a rule the field defects were not absolutely symmetrical and that various etiological factors did not produce typical fields. Lues had a frequent tendency to show relative or incomplete absolute hemianopsia. The prognosis in lues, however, was relatively good. The tumors, almost without exception, produced a primary optic atrophy, while lues and meningitis of uncertain etiology usually produced optic neuritis and secondary optic atrophy. In the cases observed, only

one showed choked disc. The treatment of the various diseases of the chiasm is also discussed.

Frederick C. Cordes.

Santha, K. **The condition of the primary optic centers in a case of unilateral peripheral blindness.** Graefe's Arch., 1932, v. 129, p. 224.

The death at sixty years of a man blind in the right eye from a suicidal shot through the optic nerve thirty-five years before afforded opportunity to study the optic nerve fibers in the external geniculate body. The left optic nerve except for a small strip was intact; the right was completely degenerated. After the semidecussation of the optic nerve fibers in the chiasm, the homolateral and contralateral (intact and degenerated) fibers in the optic tracts were not entirely separated from each other, yet in the right tract the normal contralateral fibers were more peripheral, while in the left tract the normal homolateral fibers were situated more centrally. This arrangement agrees with the findings of Wilbrand and Saenger.

On the left side, the contralateral external geniculate body presented a deficiency of fibers in its more peripheral part; on the right side, the homolateral external geniculate body showed a deficiency of fibers in the central part. The basal medullary lamina was much more lightly colored in the stained preparations on the contralateral or left side. Accordingly the ganglion cells arranged in lamellae were found atrophied in the peripheral part of the external geniculate body on the left side and in the central part on the right side. Such alternating atrophy of the cell layers of the right and left external geniculate bodies indicates that the fibers coming from both eyes end distinctly separated and not intermingled in the primary optic centers. This finding confirms fully the contention of Minkowski and differs from that of Henschen and Monokow. H. D. Lamb.

## 13. EYEBALL AND ORBIT

Naffziger, H. C. **Pathologic changes in the orbit in progressive exophthalmos, with special reference to alterations in the extraocular muscles and the optic discs.** Arch. of Ophth., 1933, v. 9, Jan., pp. 1-12.

In six cases reported by the author exophthalmos persisted after thyroidectomy and was not influenced by medication. Four of these cases were operated on bilaterally, and two on one side only. The muscles were found enormously enlarged, from three to eight times their normal size. Biopsy showed varying degrees of degeneration, with fibrosis and scleral infiltration. Operation consisted in removal of the orbital plate and the roof of the optic foramen and opening of the ring of Zinn, the approach being intracranial. In all cases the proptosis was greatly lessened, the vision improved, the papillitis and hemorrhages greatly reduced. There has been no recurrence, though some pulsation persists. M. H. Post.

## 14. EYELIDS AND LACRIMAL APPARATUS

Hippel, E. **Demodex folliculorum in chalazion.** Graefe's Arch., 1932, v. 129, p. 198.

In a woman of fifty-seven years, both eyelids of one eye were so extensively involved with multiple chalazia as to necessitate excision of the tarsi with the covering conjunctiva of both lids. Microscopic examination showed demodex folliculorum in some of the cystic meibomian glands. The mite must therefore have wandered up the ducts of these glands in the same manner as it invades the hair follicles.

H. D. Lamb.

Macmillan, J. A. **Transplantation of the lacrimal sac in chronic suppurative dacryocystitis.** Arch. of Ophth., 1932, v. 8, Dec., pp. 831-836.

The lacrimal sac is incised transversely just above the obstruction and is transplanted into the nose through a new opening in the lacrimal fossa. The epithelial lining of the sac insures continued patency of the wound. Twenty-five operations on twenty-three patients have thus far been performed. The results seem most satisfactory in those

cases with large sacs from which a large amount of pus regurgitates upon pressure. Since 1923, the operation has been confined to this type of case. Sixteen cases were followed up to 1923. Ten were cured; three were improved, but with tearing and no patency, except after probing; three were failures. Since 1923, nine cases have been operated upon; seven are completely well, according to recent reports. One patient has not reported lately, and the last one is improved, though there is blocking at times easily relieved by probing. Certain cases, owing to the bony formation found at operation, do not lend themselves to the procedure recommended, but in such cases the sac may be removed through the original incision.

M. H. Post.

Olsho, S. L. **Use of prisms in bilateral ptosis.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 141-142.

## 15. TUMORS

Fonseca, Aureliano. **Orbital adenocarcinoma.** Rev. de Ophth. de Saõ Paulo, 1932, v. 2, Dec., pp. 114-115.

In a negress of seventeen years, the right eye was displaced outward and downward, was exophthalmic, and possessed limited motility. X-ray examination disclosed a tumor in the right middle meatus, arising from the orbit. A fragment removed from the middle meatus with forceps was found microscopically to be adenocarcinoma. The patient refused operation and disappeared.

W. H. Crisp.

Galeazzi, C. **Lymphosarcoma of the orbit developed a few months after enucleation for metastatic ophthalmia.** Arch. di Ottal., 1932, v. 39, Sept. and Oct., p. 454.

The author describes a case of lymphosarcoma of the orbit. The neoplastic growth developed nine months after enucleation for metastatic ophthalmia in a child four months old. Complete exenteration of the right orbit followed recognition of the neoplastic growth. By careful study of the histological preparations of the enucleated eye and the growth, the author was able to ascertain the absolute independence of the two affections, but he is unable to draw a definite conclusion as to the precise time of development of the neoplasm.

H. D. Scarney.

Knapp, A. A. **Von Recklinghausen's disease: case presenting involvement of left eyelids.** Jour. Amer. Med. Assoc., 1933, v. 100, Feb. 18, p. 494.

Knapp reports in full detail the case of a man, aged twenty-five years, who had Recklinghausen's disease with extensive and massive involvement of the entire left side of the face, encroaching somewhat on to the right side and extending from the scalp down to and including the upper portion of the neck. The growth was flabby and was not tender. The condition apparently began in infancy, exophthalmos of the left eye having been observed at birth. At six months there was swelling and drooping of the left upper lid, with gradual extension of the swelling into the left cheek. At four and a half years of age the left eye was enucleated to improve the condition. Attempts at surgical removal had so far proved unsuccessful, causing severe hemorrhage. However, a temporal tumor was removed. The diagnosis was neurofibroma.

George H. Stine.

Krug, E. F., and Samuels, B. **Venous angioma of the retina, optic nerve, chiasm, and brain: A case report with postmortem observations.** Arch. of Ophth., 1932, v. 8, Dec., pp. 871-879.

This case showed remarkable distention and tortuosity of the vessels of the right fundus, and also slight proptosis forward, downward, and outward, with limitation of abduction and adduction. The pupils were semidilated and fixed. There were also defective speech, unsteadiness in gait, noise in the right ear, mental deterioration, and suicidal tendency, which ultimately resulted in suicide at twenty-one years of age. The case falls among vascular malformations in the class of venous angiomas. A discussion of such conditions, along with a histopathological description, concludes the paper.

M. H. Post.

Meek, R. E. **Sarcoma of the iris: report of a case complicated by a cyst.** Arch. of Ophth., 1932, v. 8, Dec., pp. 864-870.

The case here reported presented the appearance of a cyst of the iris and ciliary body, and a problem as to therapy. The eye was removed and sections showed melanosarcoma. The author concludes that enucleation is conservative treatment in such cases.
M. H. Post.

Rasquin, E. **Intraorbital multilocular dermoid cyst with oily contents.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 78.

The patient was nine years old. The swelling, first noticed a few months previously, was located at the internal angle of the orbit. The tumors lay outside the muscle funnel, and were successfully removed, with rapid relief of the exophthalmos and diplopia. There were two distinct tumors, one containing a yellowish mass resembling the contents of a sebaceous cyst, the other an oily liquid. Jerome B. Thomas.

Vancea, P. **Hyalogenous epithelioma of the eyelids. Cylindroma of the eyelids.** Graefe's Arch., 1932, v. 129, p. 191.

The author could find reports of but two cases of cylindroma of the eyelids in the entire ophthalmic literature. He adds two more, both in men, one fifty and the other forty-eight years old. In each the growth involved the inner third of the right upper eyelid. In one it had attained the size of a walnut in the period of one year. In the other it had developed to a diameter of 20 mm. during two years growth. Microscopic examination of the excised growths revealed basal-cell epithelioma with extensive hyalin degeneration.
H. D. Lamb.

## 16. INJURIES

Claes, E. M. J. **Corneal traumatism followed by secondary glaucoma.** Bull. Soc. Belge d'Opht., 1932, no. 64, p. 125.

Having watched the evolution of a hypopyon ulcer leading to adherent leucoma, and followed a year later by acute glaucoma and enucleation of the globe, the author reports in detail the results of the anatomopathologic examination of the enucleated globe. (Three photomicrographs.)
Jerome B. Thomas.

Ehlers, H. **The form of corneal wounds in perforating lesions.** Acta Ophth., 1932, v. 10, pt. 4, p. 603.

Illustrations of twenty-three perforating corneal wounds demonstrate that they are usually linear, angular, or branching. They agree with the form of experimental superficial punctured corneal wounds, which result, not in round holes, but in linear or branching figures. This is explained by the structure of the cornea which, being denser, firmer, and more complicated in its anterior than in its posterior half, shows definite fissure lines differing for various animal species. In man the fissure lines are most often linear or Y-shaped.
Ray K. Daily.

Graff, H. F. **Cilia in the anterior chamber.** Amer. Jour. Ophth., 1933, v. 16, Feb., pp. 126-128.

O'Connor, G. B. **Early grafting in burns of the eye.** Arch. of Ophth., 1933, v. 9, Jan., pp. 48-51.

It is most important to replace the lost epithelium as quickly as possible. Except in ammonia burns, the amount of destruction can be forecast in from four to six hours. Grafting should be carried out as soon as possible. In small injuries this may be done by rotating flaps, but large areas will require grafting. The graft is spread upon a stent and sutured firmly in place. The lids should be sutured together at the middle for greater firmness. The stent may be removed in twenty-four hours, but preferably remains from four to six days. M. H. Post.

Pereira Gomes. **Lesions and traumatisms observed during the constitutionalist campaign.** Rev. de Ophth. de Saõ Paulo, 1932, v. 2, Dec., pp. 87-90.

The author describes a series of burns and other direct and indirect injuries to the eyeball and its adnexa. No case of

sympathetic ophthalmia was encountered. W. H. Crisp.

Rohrschneider, W. **Morphology and origin of x-ray cataract in man.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 220-254.

Rohrschneider reports his examination of six patients who had been given large doses of x-ray for various pathological conditions and who had subsequently developed cataract. He attempted to determine whether as to morphology these cataracts could be differentiated from other types, and whether there was a special disposition on the part of certain patients to develop these lens changes. The very early and the late stages cannot be differentiated from other types of cataracta complicata. In one stage, however, the findings seem to be characteristic; vacuoles and fine opaque lines being seen under the anterior capsule, and disc-like or occasionally irregular opacities being seen at the posterior pole. The remainder of the lens appears transparent. Many patients, including those suffering from inflammatory diseases of the skin, receive large doses of x-ray without developing lens changes. Rohrschneider was unable to find any special disposition toward the development of cataract in patients with diseases of the skin in the facial area, as described by Stock.

Frederick C. Cordes.

Vannas, M. **Clinical and experimental evidence of pigment changes in eye diseases and after intraocular surgery and trauma.** Arch. f. Augenh., 1932, v. 106, Aug., pp. 1-60.

Vannas studied with the slitlamp and diascleral transillumination 613 diseased eyes, 321 operated upon, and 24 injured. Mobile pigment cells were clumped on the posterior corneal surface, where they had a tendency to arrange themselves in a vertical spindle-shaped figure. The greatest pigment mobilization took place in detachment of the retina; next comes glaucoma and high myopia; senile cataract stood fourth. The nearer the trauma was to the ciliary body or iris, the greater was the pigment change. Following intracapsular cataract extraction, the vitreous membrane was usually richly sprinkled with pigment. Abiotrophy of the eye was regarded as the most important etiological factor in this pigment disturbance. In eyes that showed great pigment disturbance, the therapeutic measures were less effective than in eyes with less pigment disturbance.

Frederick C. Cordes.

## 17. SYSTEMIC DISEASES AND PARASITES

Burghraeve, Paul. **An anatomopathological study of certain ocular lesions consecutive to infection by "treponema cuniculi."** Arch. d'Opht., 1933, v. 50, Jan., p. 64.

Treponema cuniculi resembles morphologically the spirochete of syphilis; is found in rabbits, where it produces papulosquamous lesions around the genital organs and anus; is transmitted by direct contact; and has not been cultivated. This article describes three different lesions of the eye obtained in experimental animals by Besemans and Van Canneyt with different strains of treponema cuniculi. The lesions were papulosquamous ulcer of the lids, iridocyclitis, and granuloma of the cornea. Drawings of microprojections of the last two lesions accompany the very detailed description of the anatomopathological picture presented.

M. F. Weymann.

Chiazzaro, D. **Ocular infections by anaërobic bacteria.** Ann. d'Ocul., 1932, v. 169, Dec., pp. 953-979.

A detailed study is given of the following bacilli: perfringens, tetanus, fusiform, funduliform, anaërobicus vitrei. In general the ocular media and adnexa do not favor the growth of anaërobic bacteria, but the presence of a foreign body augments the growth of these organisms. Generally these bacteria are recovered in pure culture, whereas in other parts of the body secondary infection is present. Suppuration may develop in the eye without the presence of other organisms.

H. Rommel Hildreth.

# NEWS ITEMS

News items in this issue were contributed by Drs. F. Park Lewis, Buffalo; William H. Crisp, Denver; and Luther C. Peter, Philadelphia. News items should reach **Dr. Melville Black, 424 Metropolitan Building, Denver,** by the twelfth of the month.

### Deaths

Dr. Mace H. Bell, Vicksburg, Miss.; aged fifty-two years; died, February 1st, of Addison's disease.

Dr. Theodore N. Kittelson, Fergus Falls, Minn.; aged fifty-seven years; died January 10th, of pneumonia.

Dr. John William Cahill, Worcester, Mass.; aged fifty years; died, January 15th, of lobar pneumonia and arteriosclerosis.

### Miscellaneous

The New York Association for the Blind has received $9,000 by the will of Mrs. Carrie Guggenheim.

The second Latin-American Ophthalmological Congress will be held in Buenos Aires in September, 1933.

The Illinois Society for the Prevention of Blindness, Chicago, was left $2,000 under the will of the late John Crerar.

The next examination of the American Board for Ophthalmic Examinations will be conducted at Milwaukee on Monday, June 12th, at the beginning of the week of meeting of the American Medical Association. Another examination will be held in Boston at the time of the annual meeting of the American Academy of Ophthalmology and Otolaryngology, next September.

The New York Ophthalmic Hospital recently merged with the New York Homeopathic Medical College and Flower Hospital. Under the new arrangement eye, ear, nose and throat patients of the hospital will be cared for by the ophthalmic hospital staff and a clinic for outpatient service will be maintained in a newly equipped building in the Flower Hospital group at 415 East Sixty-third street.

Upon the initiative of Professor Stock of Tübingen a large circle of pupils and friends of the late Theodor Axenfeld contributed to establish a monument to the eminent clinician and editor of Klinische Monatsblätter für Augenheilkunde. This monument has taken the form of a bronze half bust, executed by Professor Rickert of the Bielefeld Art School, and has been installed in the Freiburg Clinic which was the scene of Axenfeld's activities for three decades. The monument was unveiled on December 16, 1932, in the presence of Mrs. Axenfeld and other members of the family, as well as the entire medical faculty of the University of Freiburg, and the student body. Addresses were delivered by the present director, Professor Löhlein, and by Professor Szily of Münster.

The Executive Committee of the Section on Ophthalmology announces that the Pre-sessional Volume for 1933 will be discontinued.

### Societies

At the meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia on February 16th, the following program was presented: Dr. Walter R. Parker, Detroit, Mich. (by invitation), "The results of cataract extraction by the simple, the combined, and the intracapsular methods, Based upon 150 Cases by each method"; Dr. Arnold Knapp, New York (by invitation), "Some features of the intracapsular extraction"; Dr. E. C. Ellett, Memphis, Tenn. (by invitation), "The use of a corneal or conjunctival stitch in cataract extraction". The discussion on these subjects was opened by Doctors T. B. Holloway, C. E. G. Shannon, Luther C. Peter, and L. F. Appleman.

### Personals

Dr. Ollie S. Hodges, Beaumont, was elected president of the Texas Ophthalmological and Otolaryngological Society at the annual meeting in Fort Worth, December 3, last.

Dr. Edmund B. Spaeth addressed the Cleveland Ophthalmological Club on February 7th, on the subject, "The pathology and treatment of lacrimal gland and sac disturbances".

Dr. William J. Harrison, an assistant in the department of ophthalmology at Jefferson Medical College, has succeeded the late Dr. G. Oram Ring in his practice at 303 South 17th street, Philadelphia.

Dr. Phillips Thygeson was recently appointed assistant professor of ophthalmology, and Drs. Arthur C. Richmond and Arthur R. Kahler, assistants in ophthalmology at the University of Iowa College of Medicine, Iowa City.

Mr. Edward Bausch, president of the Bausch and Lomb Optical Company, Rochester, was the guest of honor at the annual dinner of the Society of the Genesee at the Hotel Commodore in New York, January 23. Mr. Bausch, who is seventy-nine years old, has spent his life in the business of designing microscopes and other optical instruments.

Dr. F. Park Lewis, who is internationally known through his work in the prevention of blindness, was recently awarded the Chancellor's Medal of the University of Buffalo, given for distinguished service to the city under provisions of the will of the late Charles P. Norton. Dr. Lewis is the founder of the International Association for the Prevention of Blindness and the International Organization for the Control of Trachoma. He has also been a recipient of the Leslie Dana medal.

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